STANDARD TREATMENT GUIDELINES

Edited by
Sangeeta Sharma
G.R. Sethi
Raj K. Gulati

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Delhi Society for Promotion of Rational Use of Drugs

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डा० अशोक कुमार वालिया
DR. ASHOK KUMAR WALIA

स्वास्थ्य, शहरी विकास, भूमि एवं भवन मंत्री
MINISTER OF HEALTH, URBAN
DEVELOPMENT, LAND AND BUILDING
राष्ट्रीय राजधानी क्षेत्र, दिल्ली सरकार
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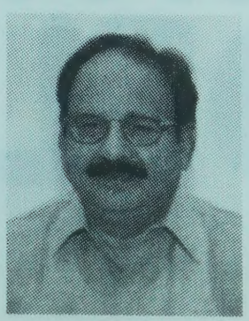

MESSAGE

The Delhi State Drug Policy was formulated and adopted in 1994. The Drug Policy is a comprehensive strategy in the transformation of pharmaceutical services. The focus of the Policy is to improve access to good quality drugs and rational drug use. While much has been achieved in improving the availability and access to good quality drugs at public health facilities by wise selection of essential drugs, pooled procurement and quality assurance measures, yet inappropriate drug use is common by both users and the prescribers,. Irrational drug use leads to waste of public and private resources. For achieving the objectives of the Drug Policy, one of the greatest challenges is to change the way in which providers, patients and the public view and use pharmaceutical use.

With great sense of satisfaction, I am introducing the completed treatment guidelines for all the doctors practicing in Delhi. This is an important milestone in pursuance of the objectives of the Drug Policy and Essential Drugs Programme. I hope these guidelines are enabling and facilitative and set a firm basis towards the attainment of equity in health care, developing rational use of drugs by all prescribers and patients.

These guidelines were developed by a wide consultation ensuring participation and ownership by healthcare providers from all levels of healthcare, national programme managers and private practitioners.

I am thankful to the team of Delhi Society for Promotion of Rational Use of Drugs under the chairmanship of Prof. Ranjit Roy Chaudhary for taking the lead to form a group for developing Standard Treatment Guidelines. The completed guidelines are a commendable achievement.

I am confident that the suggested treatment guidelines will immensely benefit the doctors in their clinical judgement and skills and would eliminate waste, further would encourage critical evaluation and hence facilitate equity in healthcare.

(DR. A.K. WALIA)

WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR SOUTH-EAST ASIA

ORGANIZATION MONDIALE DE LA SANTÉ
BUREAU REGIONAL DE L'ASIE DU SUD-EST

Tel: 91-11-337 0804
Fax: (91) 337 0197 & 337 9507

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27 August 2002

MESSAGE

The World Health Organization is supporting globally, regionally and at the national level, programmes for the rational use of drugs. This programme is an important component of the WHO Medicines Strategy. The other components are National Drug Policy, Access and Quality & Safety and the Essential Drugs Concept which is the centerpiece of the strategy.

Standard Treatment Guidelines (STGs) are an important tool which help in rational prescribing. There are other benefits when STGs are widely adopted such as in management, cost and supply of drugs. The STGs of the Delhi Society for Promotion of Rational Use of Drugs, which are based on the Essential Drug List of the Delhi State would be most useful for doctors in Delhi's government hospitals in their use of drugs. The guidelines could be easily adopted by the doctors in the private sector as well.

I congratulate the Society and all those who participated in this important exercise. This is a crucial part of the continuing activities of the Society to ensure that essential quality drugs are made available and used rationally.

Dr. Uton Muchtar Rafei
Regional Director
WHO South East Asia Region

World Health House, Indraprastha Estate, Mahatma Gandhi Marg, New Delhi-110 002, India

FOREWORD

The Delhi Society for the Promotion of Rational Use of Drugs has played a leading role in developing the temper in the country for rational, ethical and equitable use of medicines. The programme began as a programme of the Delhi Government in 1994 under the leadership of Dr. Harsh Vardhan, former Minister of Health and Family Welfare. The Society was formed two years later with the late Mr. C.R. Vaidyanathan as its first President. Soon after the India-WHO Programme was initiated with support from WHO Geneva and the programme spread to other states.

It is, therefore, with a sense of great satisfaction that I write this foreword to this volume of Standard Treatment Guidelines for Delhi State. It is one more publication in the long list of such publications brought out by the Society to provide information, guidance and help to doctors who want to practice rational therapeutics.

This book is however different because it is the joint endeavour and contribution of seventyone specialists in different branches of medicine who generously gave time in spite of their busy schedules towards the development of this book. I take this opportunity of expressing my admiration and gratitude to them and to the dedicated endeavours of the Coordination Committee of Professor JS Bapna, Professor Usha Gupta, Dr. Sangeeta Sharma, Dr. Raj K. Gulati, Professor Gopal. K. Sachdev and Professor G. R. Sethi.

The concept of using Standard Treatment Guidelines is new even though text books of medicine and guidelines of professional societies have always emphasized drugs of choice and treatment guidelines. What is new is the use of Standard Treatment Guidelines as a tool for providing the most appropriate treatment with a list of essential drugs complemented by a list of additional drugs when needed. Together with Lists of essential drugs and formularies, Standard Treatment Guidelines form the triad of tools available to the practicing physicians to treat their patients based on evidence. It is important that the patient, hospital or government does not spend scarce resources on unnecessary drugs or inappropriate combination of drugs or on a more expensive drug when a cheaper, equally effective drug is available. Irresponsible prescribing is bad therapeutics, unethical practice and results in poor economics.

These Standard Treatment Guidelines are being brought out at a time when the Planning commission has formulated its Tenth Five Year plan and when the Government of India have just brought out the National Health Policy of the country. Both these policy documents stress the importance of rational use of drugs. It is noteworthy that Standard Treatment Guidelines are specifically mentioned in the National Health Policy document I hope that doctors in the private and corporate sector will also use these Standard Treatment Guidelines. I also hope that this book will be of help to other states and organizations which wish to prepare similar guidelines.

It is a pleasure to acknowledge the constant help and guidance received from Mr. R. Parameswar, Executive Vice President of the Society and the members of the Executive Committee of the Society and Professor J.S Bapna, Convenor of the Committee set up for development of these guidelines. I wish to thank the Government of National Capital Territory for their support at all times. Finally it is a pleasure to acknowledge the technical and financial support of the Essential Drugs and Medicine Department, WHO Geneva and particularly to the contribution of Dr. Hans V. Hogerzeil in this programme.

Professor Ranjit Roy Chaudhury
President
Delhi Society for Promotion of
Rational Use of Drugs
New Delhi

ACKNOWLEDGEMENTS

The standard treatment guidelines have been developed after a lengthy consultative process. These guidelines include material from many sources and recommendations and advice from numerous individuals and groups. The groups included professional organizations, expert groups, doctors from medical colleges and secondary and tertiary hospitals.

We offer sincere thanks to all those who contributed appropriate and relevant information, members of the Essential Drugs Committee for Delhi state, the technical and editorial expert committees, the core group, the editors and the reviewers. Without their dedication to the process, and always improving the document every time they read it, it might have not been possible to bring out this publication.

This publication has become possible because of the funds made available by India WHO Essential Drugs Programme and the technical assistance ungrudgingly provided by Dr. Hans V. Hogerzeil, Coordinator for Policy, Access and Rational Use, Department of Essential Drugs & Medicines Policy, WHO, Geneva and also due to the all out encouragement extended by the Govt. of NCT of Delhi.

A special word of thanks goes to Mr. S.P. Dubey for computer processing and Ms. Madhu Kapoor, Mr. R.K. Uppal and Mrs. P Dua for their assistance and co-ordination of all the activities. We thank M/S Apothecaries Ltd, New Delhi for copy editing.

DSPRUD and other staff at IHBAS willingly undertook the task of proof reading and the office of WHO Representative to India and Regional office for South East Asian Region provided financial support for printing. Once again we express our heartfelt gratitude to the unstinting support given by each and every one of our team.

PREFACE

These guidelines were developed under the auspices of the Delhi Society for Promotion of Rational Use of Drugs by the contributors.

Rational use of drugs for medical conditions leads to a more effective treatment at an affordable cost. Standard treatment guidelines are an important component of promotion of rational use of drugs. Delhi Society for Promotion of Rational Use of Drugs has been working on this issue since 1996 and has been instrumental in making essential drugs list, setting up Central Procurement Agency etc. Society felt that it was now time to prepare STG's for the practicing physicians as next step. Local manuals are needed in every health system because of differing decisions about drug choices and patterns of illness. These guidelines were developed with contribution from 71 specialists. Ideally, such guidelines should be evidence based. It is generally recommended that advice on medical treatment should be based on results of adequately powered, double blind, placebo-controlled trials or meta-analysis of several such trials. Unfortunately evidence of this standard is often lacking and many guidelines amount to little more than the opinion of author. This book is a blend of good evidence with consensus of experts.

These guidelines are comprehensive but not exhaustive and seek to summarize data to inform the treatment of the patients presenting with priority diseases.

These guidelines can be viewed as an expert consultation, to be weighed in conjunction with other information and in the context of each individual patient-physician relationship. The recommendations do not replace clinical judgement, which must be tailored to the particular needs of each clinical situation. It may not be possible to treat some of the diseases according to standard treatment guidelines at the primary level because of nonavailability of trained personnel or infrastructure. It is expected that the treating physician will be able to stabilize the patient and make referral to a higher facility.

This manual will be useful as a ready reference for the healthcare providers and supply management staff. This is not a complete textbook. For some diseases, one may have to refer to a reference book. This book merely provides guidelines for the treatment of various conditions and does not encroach upon the clinical flexibility. The key features of the process of development of these guidelines included the following:

Initial drafting was done by a working group that included doctors with clinical and research expertise in their respective field. The group consisted of about 69 doctors who are in active clinical practice and academic endeavour. In addition, some contributors are also involved in the research and National Programme development and evaluation. Contributors and reviewers have all been asked to base their recommendations on the basis of a comprehensive literature review and an objective evaluation of the available evidence. This was followed by the production of the drafts with internal reviews by the core group and circulation of the draft guidelines for peer review to the experts in various specialties for their comments.

It is our hope that the expert advice provided in these guidelines will make the treatment more specific and effective. We thank all the experts and reviewers who gave their time and expertise in preparing the document. We greatly appreciate our reviewers for careful reading and many thoughtful suggestions that helped to make these guidelines more clinically useful.

(J S Bapna)
Director,
Institute of Human Behaviour & Allied Sciences and
Vice President,
Delhi Society for Promotion of Rational Use of Drugs

HOW TO USE THESE GUIDELINES

This book is an attempt to give guidelines for treatment of common diseases, keeping in mind the rational use of drugs for each clinical condition. It is assumed that the patient has been fully evaluated and all co-morbidities identified. Treatment of the patient would involve a holistic approach and would require the expertise of the treating physician in formulating a treatment plan.

We describe groups of patients and make suggestions intended to apply to average patient in each group. However, patients will differ greatly in their presentation, treatment preference and capacities in their history of response to previous treatments, their family history of response to treatment, and their tolerance for different side effects; therefore, the experts first line recommendations may not be appropriate in all circumstances. It begins at the point when the doctor has already diagnosed a patient suffering from that particular disease and has evaluated the patient to ascertain the presence of other concomitant disorders and other medical factors that may affect the diagnosis or treatment of the patient. We assume clinicians using these guidelines are familiar with assessment and diagnostic issues. This book only deals with treatment of individual diseases.

It is divided into twenty chapters. First two chapters deal with general disease and emergencies which may be common to all specialties. The aim is to provide complete management of commonly encountered diseases and emergency cases with clear instructions for referral (when, where and how) to a higher centre with facilities for appropriate management. Rest of the chapters deal with common diseases in each specialty namely medicine, ENT, eye, skin, obstetrics & gynaecology, psychiatry, orthopaedics, surgery and paediatrics. Paediatric section provides treatment of diseases specifically encountered in paediatric age group. Other diseases which are commonly encountered in adults are also discussed in the respective section with doses in children.

The format of guidelines is such that it gives only a few salient features of the disease and important diagnostic tests followed by nonpharmacological and pharmacological treatment. Nonpharmacological treatment being an important aspect has been described very clearly. Pharmacological treatment deals with drug therapy.

Drugs are selected on the basis of balanced criteria of efficacy, safety, suitability and cost. Drugs are mentioned in generic names only. Combination drugs are not included in the treatment except for some topical preparations e.g. in eye, ENT and skin preparations. These combinations were selected on the basis of appropriate ingredients and availability in the market.

Wherever drug choices are given for the treatment of a disease, they are listed in order of their preference. Where there are many equiefficacious alternatives available, only 2-3 preferable choices are mentioned to enable flexibility in the treatment. Drug choices are demarcated by 'Or'. If several drugs are required concomitantly for treatment they are mentioned as 1,2,3 and so on. Drugs that lack evidence of efficacy and safety but are being used in practice, have not been mentioned in the treatment guidelines for obvious reasons. Drug dose is given as a range and wherever required in per kilogram dose with maximum tolerated dose. The frequency, route and special precautions are mentioned very clearly. Modification of treatment after monitoring the response as the next important step is described in the pharmacotherapy. Generally, the text is given in telegraphic language and rationale for a particular choice of drug or modality of treatment is not mentioned.

If a particular treatment needed mention at several places viz fever, shock, pain relief, in that case details are given in one section with a note 'for details see relevant section'.

No treatment is complete without a good communication with the patient about prognosis, natural course of the disease, precautions and important side effects of drugs. There is a section on patient education at the end of each treatment guideline.

We have relied on expert opinion precisely because we are asking crucial questions that are not well answered by the literature. One thing that the history of medicine teaches us is that expert opinion at any given time can be very wrong. Accumulating research will ultimately reveal better and clearer answers. Clinicians should therefore stay abreast of the literature for developments. We will continue to revise the guidelines periodically based on new research information and on reassessment of expert opinion to keep them up-to-date.

No set of guidelines can ever improve practice if read just once. These guidelines are meant to be used in an ongoing way, since each patient's status and phases of illness will require different interventions at different times. We believe the guideline recommendations will reinforce your best judgement when you are in familiar territory and help you with new suggestions when you are in a quandary.

EDITORIAL BOARD

Chairperson
Prof. Ranjit Roy Chaudhury, Emeritus Scientist and President DSPRUD, National Institute of Immunology, Aruna Asaf Ali Marg, New Delhi 110067.

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Prof. J. S. Bapna, Director, Institute of Human Behaviour and Allied Sciences, Post Box: 9520, Jhilmil, Delhi 110095.

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Dr. Sangeeta Sharma, Assistant Professor, Department of Neuropsychopharmacology, Institute of Human Behaviour and Allied Sciences , Post Box: 9520, Jhilmil, Delhi 110095 and Technical Coordinator, WHO-India Essential Drug Programme, DSPRUD, National Institute of Immunology, Aruna Asaf Ali Marg, New Delhi - 110067.

Dr. Raj K Gulati, Assistant Professor, Department of Neuropsychopharmacology, Institute of Human Behaviour and Allied Sciences, Post Box: 9520, Jhilmil, Delhi 110095.

Technical Advisors
Dr. G. R. Sethi, Professor, Department of Paediatrics, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi 110002.

Dr. Gopal K. Sachdev, Professor, Department of Medicine, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi-110002.

CONTRIBUTORS

Medicine

Principal Co-ordinator

Prof. Gopal K. Sachdev, Department of Medicine, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Members

Dr. Naresh Gupta, Professor, Department of Medicine, Lady Hardinge Medical College and Ram Manohar Lohia Hospital, New Delhi.

Dr. Rita Sood, Additional Professor, Department of Medicine, All India Institute of Medical Sciences, New Delhi.

Dr. Mukul Agarwal, Reader, Department of Medicine, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Dr. (Lt. Col.) Rajat Kumar, Medical Specialist, Army Hospital R&R, New Delhi.

Dr. Atul Prasad, Associate Professor & Head, Department of Neurology, Institute of Human Behaviour and Allied Sciences, Delhi.

Dr. Rajeev Thakur, Assistant Professor, Department of Microbiology, Institute of Human Behaviour and Allied Sciences, Delhi.

Dr. Kiran Bala, Assistant Professor, Department of Neurology, Institute of Human Behaviour and Allied Sciences, Delhi.

Paediatrics

Principal Co-ordinator

Prof. G. R. Sethi, Department of Paediatrics, Maulan Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Members

Dr. Sidharth Ramji, Professor, Department of Paediatrics, Maulana Azad Medical College, New Delhi.

Dr. Piyush Gupta, Professor, Department of Paediatrics, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Dr. Maya Shankar Prasad, Professor & Head, Department of Paediatrics, Safdarjung Hospital, New Delhi.

Dr. Varinder Singh, Associate Professor, Department of Paediatrics, Lady Hardinge Medical College and Kalawati Saran Children Hospital, New Delhi.

Dr. Urmila Jhamb, Department of Paediatrics, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Dr. H.S. Yadav, Delhi Administration Dispensary, Kalkaji, New Delhi.

Dr. Mamta Sharma, Professor & Head, Department of Paediatrics,

Deen Dayal Upadhyay Hospital, New Delhi.

Dr. Sushil Kabra, Additional Professor, Department of Paediatrics, All India Institute of Medical Sciences, New Delhi.

Dr. Jagdish Chandra, Professor, Department of Paediatrics Lady Hardinge Medical College, and Kalawati Saran Children Hospital, New Delhi

Dr. Alok Pradhan, Department of Paediatrics, Kasturba Hospital, Delhi

ENT

Principal Co-ordinator

Dr. A. K. Agarwal, Head, Department of ENT, Maulana Azad Medical College and Asociated Lok Nayak Hospital, New Delhi.

Members

Dr. N. N. Mathur, Professor, Department of ENT, Lady Hardinge Medical College, New Delhi.

Dr. T. S. Siddhu, Head, Department of ENT, Ram Manohar Lohia Hospital, New Delhi.

Dr. K. K. Handa, Assistant Professor, Department of ENT, All India Institute of Medical Sciences, New Delhi.

Dr. Achal Gulati, Professor, Department of ENT, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Dr. Shelly Chadha, Asstt. Professor, Department of ENT, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Orthopaedics

Principal Co-ordinator

Dr. Anil Arora, Reader, Department of Orthopaedics, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Members

Dr. S. K. Khare, Specialist, Department of Orthopaedics, Deen Dayal Upadhyay Hospital, New Delhi.

Dr. Ish Dhami, Specialist, Department of Orthopaedics, Guru Teg Bahadur Hospital, Delhi.

Dr. Jitender Monga, Senior Resident, Department of Orthopaedics, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Psychiatry

Principal Co-ordinator

Dr. R. K. Chadda, Additional Professor, Department of Psychiatry, Institute of Human Behaviour and Allied Sciences, Delhi.

Members

Dr. S. K. Khandelwal, Professor, Department of Psychiatry, All India Institute of Medical Sciences, New Delhi.

Dr. R.C. Jiloha, Professor, Department of Psychiatry, G. B. Pant Hospital, New Delhi.

Dr. Somnath Sengupta, Associate Professor, Department of Psychiatry, Institute of Human Behaviour & Allied Sciences, Delhi.

Obstetrics & Gynaecology

Principal Co-ordinator

Dr. Geeta Radhakrishnan, Department of Gynaecology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Members

Dr. Aruna Batra, Sr. Specialist, Department of Gynaecology, Safdarjung Hospital, New Delhi.

Dr. Gauri Gandhi, Associate Professor, Department of Gynaecology, Maulana Azad Medical College and Lok Nayak Hospital, New Delhi.

Dr. A.G. Radhika, Specialist, Department of Gynaecology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Dr. Alka Goel, Specialist, Department of Gynaecology, Ram Manohar Lohia Hospital, New Delhi.

Dermatology

Principal Co-ordinator

Dr. M. C. Baruah, Head, Department of Dermatology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Members

Dr. J. S. Pasricha, Specialist, Department of Dermatology, All India Institute of Medical Sciences, New Delhi.

Dr. M. Ramam, Specialist, Department of Dermatology, All India Institute of Medical Sciences, New Delhi.

Dr. Vijay Gandhi, Pool Officer, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Dr. S. N. Bhattacharya, Associate Professor, Department of Dermatology University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Dr. Archna Singal, Reader, Department of Dermatology University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Dr. Atul Kochhar, Department of Dermatology, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Eye

Principal Co-ordinator

Dr. V. P. Gupta, Professor and Head, Department of Ophthalmology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Members

Dr. Kirti Singh, Assistant Professor, Guru Nanak Eye Centre, New Delhi.

Dr. Lalit Verma, Additional Professor, Department of Eye, (RP Centre), All India Institute of Medical Sciences, New Delhi.

Dr. Pradeep Venkatesh, Asstt. Professor, Department of Eye (RP Centre), All India Institute of Medical Sciences, New Delhi.

Pharmacology

Principal Co-ordinator

Dr. Dinesh Chandra, Dean, Maulana Azad Medical College, Bahadur, New Delhi.

Members

Dr. Uma Tekur, Professor, Department of Pharmacology, Maulana Azad Medical College, New Delhi.

Dr. Vandana Roy, Assistant Professor, Department of Pharmacology, Maulana Azad Medical College, New Delhi.

Dr. S. K. Bhattacharya, Professor, Department of Pharmacology, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi.

Surgery

Principal Co-ordinator

Dr. V. K. Malik, Department of Surgery, Maulana Azad Medical College and Associated Lok Nayak Hospital, Bahadur Shah Zafar Marg, New Delhi

Members

Dr. Anup Mohta, Associate Professor, Department of Surgery, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi.

Dr. Anurag Srivastava, Professor, Department of Surgery, All India Institute of Medical Sciences, New Delhi.

Dr. Arvind Kumar, Additional Professor, Department of Surgery, All India Institute of Medical Sciences, New Delhi.

Dr. Pramod Kohli, Kohli Nursing Home, Sarang Road, Sonipat, Haryana.

Dr. T. K. Thusoo, Professor, Department of Surgery, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Dr. N. S. Hadke, Professor, Department of Surgery, Lady Hardinge Medical College, New Delhi.

Dental

Principal Co-ordinator

Dr. Sangeeta Talwar, Professor, Dental Department, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Members

Dr. Dhirendra Srivastava, Professor, Department of Oral and

Maxillofacial Surgery, Maulana Azad Medical College, New Delhi.

Dr. Arundeep Kaur, Associate Professor, Department of Peridontics, Dental Wing, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Anaesthesia

Principal Co-ordinator

Dr. Rajiv Chawla, Professor, Department of Anaesthesiology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Members

Dr. Medha Mohta, Reader, Department of Anaesthesiology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi

Dr. Vandana Saith, Senior Resident, Department of Anaesthesiology, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi.

LIST OF REVIEWERS

Dermatology
Dr. Joseph Sundaram, Dermatology Clinic, No.-1 KD Market, Pitampura, Delhi.

Obstetrics and Gynaecology
Dr. Neera Aggarwal, Professor & Head, Department of Obstetrics & Gynaecology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi.

Dr. Kamla Ganesh, Retired Professor, Maulana Azad Medical College, D-1 Gulmohar Park, New Delhi.

Psychiatry
Dr. N. N. Wig, Emeritus Professor, Post Graduate Institute of Medical Educational Research, Chandigarh.

Dr. Ajit Awasthi, Professor, Department of Psychiatry, Post Graduate Institute of Medical Educational Research, Chandigarh.

Medicine
Dr. S. K. Aggarwal, Director Professor and Head, Department of Medicine, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Pharmacology
Dr. Prabha Mahajan, Professor Department of Pharmacology, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi.

Paediatrics
Dr. Sudhansh Malhotra, Assistant Commissioner, Nirman Bhawan, New Delhi.

Dr. S. K. Mittal, Director Professor and Head, Department of Paediatrics, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

Dr. Y. Govil, Professor, Department of Paediatrics, King George's Medical College, Lucknow.

Dental
Dr. Tulika Tripathi, Professor, Department of Dental Surgery, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi.

ENT
Dr. Y. N. Mehra, Emeritus Professor ENT & Ex-Dean, Post Graduate Institute of Medical Educational Research, Chandigarh.

Surgery
Dr. V. Seenu, Associate Professor, Department of Surgery, All India Institute of Medical Sciences, New Delhi.

Orthopaedics
Dr. S. Kapoor, Professor, Department of Orthopaedics, Maulana Azad Medical College and Associated Lok Nayak Hospital, Delhi.

Ophthalmology
Dr. G. S. Mangat, Venu Eye Centre, Sheikh Sarai, New Delhi.

ABBREVIATIONS USED

Units

µg/mcg = microgram
g = gram
IU = international units
kg = kilogram
mg = milligram

Routes

IM = intramuscular
IV = intravenous
PO = per oral
PR = per rectum
PV = per vaginum
SC = subcutaneous

General

ABG = arterial blood gas
AFB = acid fast bacilli
AFP = acute flaccid paralysis
APH = antepartum haemorrhage
ASOM=acute suppurative otitis media
BP = blood pressure
CBC = complete blood count
CCF = congestive cardiac failure
CNS = central nervous system
COAD= chronic obstructive airway diseases
CPAP= continuous positive airway pressure
CPR = cardiopulmonary resuscitation
CSF = cerebrospinal fluid
CSOM=chronic suppurative otitis media
CVP = central venous pressure
DUB = dysfunctional uterine bleeding
EEG = electroencephalogram
ERCP= endoscopic retrograde cholangiopancreatography
FNAC= fine needle aspiration cytology
GERD=gastroesophageal reflux disease
GIT = gastrointestinal tract
Hct = haematocrit
HR = heart rate
INR = international normalized ratio
JVP = jugular venous pressure
KFT = kidney function test
LFT = liver function test
MCH = maternal-child health
MTP = medical termination of pregnancy
NSAIDs=nonsteroidal anti-inflammatory drugs
OCD = obsessive compulsive disorder
ORS = oral rehydration solution
ORT = oral rehydration therapy
PEEP= peak end expiratory pressure
PCR = polymerase chain reaction
PCWP=pulmonary capillary wedge pressure
PID = pelvic inflammatory disease
PPH = postpartum haemorrhage
PMS = premenstrual syndrome
PUO = pyrexia of unknown origin
RAP = recurrent abdominal pain
RBBB= right bundal branch block
RBC = red blood cell
RR = respiratory rate
STD = sexually transmitted disease
USG = ultrasonogram
WBC = white blood cells

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Modification form

1

COMMON CONDITIONS

ACUTE FEVER

The overall mean oral temperature for healthy adult individuals is 36.8 ± 0.4°C, with a nadir at 6 AM and a peak at 4-6 PM. An AM temperature of greater than 37.2°C and a PM temperature of greater than 37.7°C is defined as fever. Fever may be continuous, intermittent or remittent. However, with frequent self-medication with antipyretics, classic patterns are not generally seen.

Diagnosis

It is important to work towards finding the cause of fever. A meticulous history of chronology of symptoms, any associated focal symptom(s), exposure to infectious agents and occupational history may be useful. A thorough physical examination repeated on a regular basis may provide potentially diagnostic clues.

Diagnostic tests

A large range of diagnoses may possibly be the cause of fever. If the history and physical examination suggest that it is likely to be more than a simple URI or viral fever, investigations are indicated. The extent and focus of diagnostic work-up will depend upon the extent & pace of illness, diagnostic possibilities and the immune status of the host. If there are no clinical clues, the work-up should include a complete haemogram with ESR, smear for malarial parasite, blood culture, Widal test, urine analysis including urine culture. If the febrile illness is prolonged to more than 2 weeks, an x-ray chest is indicated even in the absence of respiratory symptoms. Any abnormal fluid collection should be sampled.

Treatment

Routine use of antipyretics in low-grade fever is not justified. This may mask important clinical indications. However, in acute febrile illnesses suggestive of viral or bacterial cause, fever should be treated.

Nonpharmacological

Hydrotherapy and rest.

Pharmacological

Non-Specific

Tab. Paracetamol 500-1000 mg 6-8 hourly.

Or

Tab. Ibuprofen 400-600 mg 8 hourly.

Or

Tab. Nimesulide 100 mg 12 hourly.

Specific

Antibiotics/antimalarials depending upon the cause suggested by clinical and laboratory evaluation.

Outcome: In most cases of fever, patient may either recover spontaneously or a diagnosis is reached after repeated clinical evaluation and investigations. If no diagnosis is reached in upto 3 weeks, patient is said to be having fever of unknown origin (FUO) and is managed accordingly.

Patient education

- Self medication should be avoided.
- Antibiotics should be taken only on advise of a physician.
- Avoid covering the patient having high fever with blanket etc.
- Plenty of fluids should be taken. Stay in cool environment. Cold sponging of face and limbs should be done repeatedly.

References

1. Alterations in Body Temperature. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., pp 90-94.
2. Physiological Changes in Infected Patients. In: Oxford Textbook of Medicine. Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 290-95.

FEVER IN CHILDREN

Fever in children is defined as a rectal temperature of >38°C, oral temperature of > 37.5°C or an axillary temperature of > 37.2° C. Fever less than 41.7°C does not cause brain damage. Only 4% of children with fever develop febrile seizure.

Hyperpyrexia. Fever above 41.5°C is called hyperpyrexia and warrants aggressive antipyretic therapy because of risk of irreversible organ damage.

Fever of Unknown Origin (FUO). It is defined as fever of more than

three weeks duration, documented fevers above 38.3°C on multiple occasions, and lack of specific diagnosis after 1 week of admission and investigation in a hospital setting.

Nosocomial FUO. This refers to hospitalized patients receiving acute care in whom infection or fever were absent on admission but in whom a fever of 38.3°C or more occurs on several occasions. Multiple readings of more than 38.3°C in a patient with less than 500 neutrophils/mm3 are labeled as **neutropenic FUO**.

Treatment

Documentation of fever

- Oral temperature is accurate provided no hot/cold drinks have been consumed in preceding 20 minutes. Axillary temperatures are least accurate and rectal thermometers are uncomfortable, especially in older children. Their use should be restricted to children < 6 months.
- Thermometer must be left in place for 2 minutes for rectal, 3 minutes for oral and 5-6 minutes for recording axillary temperature.
- Mercury thermometer is accurate and inexpensive. Digital thermometers may measure temperature within 2 seconds and are accurate but expensive. Liquid crystal strips applied to forehead for recording temperature are not accurate.

Find a cause

- Try to find a focus of infection by careful history and physical examination.
- Short duration fevers (less than 2 weeks) are usually due to infections. Look for any characteristic feature suggesting involvement of a particular system. Character of the fever (such as relapsing, pel ebstein, step ladder etc) may give a clue to the cause. Heat hyperpyrexia, dehydration fever, allergy to drug (drug fever), and hemolytic crisis are less common causes of short fevers.
- Long duration fevers lasting more than 2 weeks should be investigated for infections, malignancies, connective tissue disorders, autoimmune diseases and metabolic causes.
- Appropriate laboratory investigations such as total and differential leucocyte count, peripheral smear, urinalysis, serological tests, radiological investigations, and cultures of blood and body fluids are carried out as indicated by the signs and symptoms related with fever.

Children with any one of the following conditions must be seen immediately:

- Age < 3 months old, Fever > 40.6 °C, crying inconsolably, crying

when moved/touched, difficult to awaken, neck is stiff, purple/red spots are present on skin, breathing is difficult and does not get better even after clearing of nasal passages, drooling of saliva and inability to swallow, convulsions and looks or acts very sick

Children with any one of the following should be seen as early as possible:

- Child is 3-6 months old (unless fever occurs within 48 hours after a DPT vaccination and has no other serious symptom), fever>40°C, burning/pain occurs during micturition, fever has been present for >24 hours and then returned and in case of fever present for more than 72 hours.

Nonpharmacological

- Assure parents and explain that low grade fever need not be treated.
- Give more fluids.
- Dress in only one layer of light clothing.
- Place in a cool and airy environment.
- *Sponging.* Sponge with lukewarm water (never alcohol) in children with febrile delirium, febrile seizure, and fever > 41.1°C. Give paracetamol 30 minutes before sponging. Until paracetamol has taken effect, sponging will cause shivering, which may ultimately increase the temperature.
- Heat stroke requires immediate cold water sponging.
- The body may be massaged gently so that the cutaneous vessels dilate and body heat is dissipated.
- For children less than 3 months of age:

  Identify the low risk febrile infant as per Table I. These children can be managed on outpatient basis.

  Hospitalize, if appears toxic or does not fulfil the criteria in Table I.

Table I. ***Identification of febrile infant <3 months of age at low risk for serious bacterial infection.***

1. Non-toxic
2. Previously healthy
3. No bacterial focus on examination
4. Good social status
5. WBC count 5000-15,000/μl and < 1500 band forms/ μl.
6. Urine microscopy of centrifuged specimen shows ≤ 10 pus cells/hpf
7. If diarrhoea present, stool microscopy reveals ≤5 pus cells/hpf.

In children more than 3 months of age

Rectal temperature less than 39°C need not be treated.

- Temperatures higher than 39°C need administration of antipyretics.

Pharmacological

Tab/Syr Paracetamol 15 mg/kg/dose, dose can be repeated at 4 hourly intervals (Paracetamol reduces fever by 1-2°C within 2 hours).

Or

Tab/Syr Ibuprofen 10 mg/kg/dose, dose can be repeated at 8 hourly intervals

(Note: Efficacy is similar to paracetamol. Effect lasts for 6-8 hours as compared to 4-6 hours for paracetamol).

Or

Tab/Syr Nimesulide 5 mg/kg/day

(Note: Should only be used in diagnosed fever, since prolonged antipyretic effect may mask the pattern of fever)

(**CAUTION:** Aspirin should NOT be used for the risk of Reye's syndrome)

Specific treatment for the cause of safety and fever should be simultaneously undertaken.

Monitoring

Close monitoring of all children, especially young febrile infants, is essential.

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2. Fevers in Childhood. In: Ghai's Essential Pediatrics. Ghai OP, Gupta P, Paul VK (eds). New Delhi, Interprint. 2000; pp 175-178.
3. Fever in the Young Infant. In: Evidence based Pediatrics and Child health. Eds Meyer VA, Elliott EJ, Davis RL, Gilbert R, Klassen T, Logan S et al. London, BMJ Books 2000; pp 168-177.
4. Fever Without Focus in the Older Infant. In: Evidence based Pediatrics and Child health. Meyer VA, Elliott EJ, Davis RL, Gilbert R, Klassen T, Logan S et al (eds), London, BMJ Books 2000; pp 178-185.
5. Kramer MS, Shapiro ED. Management of the young febrile child. A commentary on recent practice guidelines. Pediatrics 1997; 100: 128.

FEVER OF UNKNOWN ORIGIN (FUO)

FUO is defined as the presence of fever of 38.3° C or more recorded on several occasions, evolving for at least 3 weeks with no diagnosis reached even after one week of relevant and intelligent investigations. FUO is usually an uncommon presentation of common diseases.

Further, Durrack and Street have classified FUO into four main categories.

1. Classic FUO - corresponds to the previous definition except that instead

of one week of investigations, it requires upto 3 outpatient visits or 3 days in the hospital.

2. HIV related FUO - the duration of fever is increased to 4 weeks instead of 3 weeks. .
3. Nosocomial FUO - fever of >38.3^0 C on several occasions lasting for more than 72 hours, developing after admission in a hospitalized patient and remains undiagnosed after 3 days of investigation including 2 days incubation of cultures.
4. Neutropenic FUO - similar to the previous definition, except that it occurs in a patient who has neutrophil count of less than 500/cu.mm or expected to fall to this level in 1-2 days.

In cases who donot fit into any of the above definition, the patient should be referred to a specialist for investigations and management.

Common causes

A large number of conditions can present as classic FUO; the important categories being infections, neoplastic conditions, noninfectious inflammatory causes e.g. collagen vascular diseases, drug fevers, and various other causes. Infections, particularly extrapulmonary tuberculosis are the commonest causes of FUO in India. In HIV positive patients, the common causes are typical and atypical mycobacterial infections, pneumocystis carinii pneumonia, toxoplasmosis, lymphoma etc. In neutropenic patients, gram negative, bacterial, staphylococcal and fungal infections are important causes.

Salient features

- Prolonged unexplained fever, often with no localizing clue on history, physical examination and basic laboratory investigations.

Diagnostic evaluation

A detailed clinical history and repeated and meticulous physical examination are valuable in providing potentially diagnostic clues (PDC) to the cause of fever in these patients. No single algorithmic approach to diagnosis can be recommended for all patients of FUO and diagnostic approach needs to be individualized.

A complete haemogram including peripheral blood smear for malarial parasite, serum biochemistry particularly liver function tests, a tuberculin test and x-ray of chest should be done in every patient with prolonged fever. Other investigations which are often helpful include tests related to collagen vascular disease, an ultrasonography of abdomen to localize

intra-abdominal foci of infections and a contrast enhanced computed tomography (CECT) of chest and abdomen in detecting mediastinal lymph nodes and parenchymal lung abnormalities not seen on conventional chest x-ray. Further, diagnostic approach should take into consideration the PDCs from the evaluation of history, results of repeated physical examination, basic investigations and any investigations done prior to this episode. If any abnormal or doubtful lesion is detected FNAC/biopsy should be obtained.

Treatment

Treatment will be based on the specific cause of fever. Thorough investigations generally yield a specific cause of fever in about 90% of patients. Sometimes evaluation may need discontinuation of all drugs being taken by the patient to rule out drug fever as the cause of FUO.

Symptomatic treatment for fever (for details see section on fever). Cold sponging may be done if fever produces discomfort. The emphasis in patients with classic FUO is on continued observation and examination. (CAUTION: Avoid 'shotgun' trials. Empirical therapy consisting of therapeutic trials commonly used in patients with FUO are: antibiotics, antituberculous treatment (ATT) and corticosteroids).

The ability of glucocorticoids and NSAIDs to mask fever while permitting the spread of infection dictates that their use should be avoided unless infection has been largely ruled out.

If on the basis of clinical evaluation and inability to reach a definitive diagnosis, a therapeutic trial is started, the following principles must be kept in mind:

- Give only one set of trial at a given time.
- The doses of drugs and period of therapeutic trial must be adequate.
- The patient must be followed closely for response.

Follow-up

In about 10% of cases, no cause may be diagnosed despite thorough evaluation. In such cases, if patient is well preserved, just a close clinical and investigative follow-up may be enough to look for any PDCs which may be evolving or appear later in the course of disease. However, if the patient is sick or is deteriorating and no diagnosis is reached, an appropriate empirical therapeutic trial is justified.

Patient education

- Self medication should be avoided.
- Antibiotics should be taken only on advise of a physician.
- Avoid covering the patient with high fever with a blanket etc.

- Plenty of fluids should be taken. Stay in a cool environment. Cold sponging of face and limbs should be done repeatedly.

References

1. Fever of Unknown Origin. In: An old friend revisited, 1992, Arch Intern Med, pp 152: 21.
2. Fever of Unknown Origin - re-examined and redefined. In: Current Clinical Topics in Infectious Diseases. 1991, pp 11:35-51.
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ANAEMIA

Anaemia is defined as a low haemoglobin level. For males it <13.5 g/dl while for females it is <11.5 g/dl.The common causes of anaemia in India are:

- Reduced production due to deficiency of iron, folic acid, rarely vitamin B_{12} or an ineffective erythropoiesis secondary to many causes (anaemia of chronic disease, secondary to infections and inflammation endocrinal disorders, primary bone marrow disorders like infiltration or hypoplasia).
- Blood loss (which also leads to iron deficiency).
- Increased destruction of RBCs (haemolysis due to many causes of which thalassemia is the commonest).

Salient features

- Tiredness, weakness and lack of desire to work.
- Nails and tongue look pale. Severe anaemia produces general pallor and swelling of feet.
- Most aetiologies may be determined on the basis of MCV performed in an accurate cell counter as follows:
  - Low MCV - Iron deficiency or haemoglobinopathy like thalassemia.
  - High MCV - Folic acid or B_{12} deficiency. Less commonly alcohol intake, liver disease, haemolysis and hypothyroidism.
  - Normal MCV - Anaemia of chronic disease, primary bone marrow disorders, renal failure, haemolysis.

In case of associated leucocyte and platelet abnormalities or if anaemia does not respond to therapy in 4 weeks despite correcting the apparent cause, a bone marrow examination by aspiration/biopsy should be performed.

Treatment

Iron deficiency anaemia

1. Treat the underlying cause: menorrhagia in women, gastrointestinal blood loss in all age groups including hookworm infestation, dietary deficiency, rarely malabsorption.
2. Tab. Ferrous sulfate 200 mg 3 times a day. Reduce the dose as haemoglobin rises to over 10 g/dl. Once haemoglobin is normal, continue with 1 tablet daily for at least three months.

   Other preparations of iron are not superior, but they can be tried if patient does not find ferrous sulfate suitable. These include ferrous fumarate and ferrous gluconate.

   The rate of rise of haemoglobin should be 1 g/dl per week. If this does not occur, consider ongoing blood loss, noncompliance, associated haemoglobinopathy like thalassemia carrier status, malabsorption, or an incorrect diagnosis.

   Parenteral iron does not lead to a faster rise in haemoglobin. It is indicated in the following situations: (i) Malabsorption of iron, (ii) Intolerance of oral iron, (iii) In late pregnancy to ensure fetal stores of iron are replenished rapidly, (iv) If ongoing blood loss exceeds the capacity to absorb oral iron (like in inoperable malignancy), (v) In noncompliant patient. There is danger of anaphylactoid reactions, hence facilities to manage these should be readily available.

(For details see also anaemia in pregnancy and paediatric section)

Folic acid deficiency

1. Treat the cause: Dietary deficiency, increased requirement as in pregnancy and children, haemolytic anaemia.
2. Tab. Folic acid 5 mg daily. This dose is adequate even in malabsorption syndromes.

Vitamin B_{12} deficiency

1. Treat the cause: Dietary deficiency in vegetarians, pernicious anaemia. Although uncommon, it is also underdiagnosed due to lack of facilities.
2. Tab. Vitamin B_{12} as in haematinic tablets.

   Or

   Inj. B_{12} 1000 mcg (in most B complex vitamins) IM one injection on alternate days for total 5 injections, then once a week for 5 weeks, then once in 3 to 6 months will be adequate for most patients.

Patient education

- Educate the patient about preventive measures for worm infestation.
- Inform about importance of taking adequate food with green leafy vegetables to meet the nutritional requirement.
- Cooking food in iron utensils may increase iron content in the diet.
- Instruct the patient to take iron tablets after food; iron tablets sometimes produce stomach upset.
- Inform the patient that the stools could turn black during iron therapy.
- Reduce the dose of iron if it produces stomachache, diarrhoea or constipation.
- Explain that the response to iron if it therapy is gradual and it takes weeks or months for blood to become normal. Continue iron tablets for six months.
- Keep iron tablets out of the reach of children. They may swallow the tablets as candies causing adverse reactions including death.

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DIZZINESS AND VERTIGO

The term dizziness is used for lightheadedness, faintness, spinning, giddiness, confusion and blackouts. Dizziness is classified in three categories - (1) faintness (syncope and presyncopal symptoms), (2) vertigo and (3) miscellaneous head sensation. The common causes of vertigo include benign paroxysmal positional vertigo (BPPV), vestibular neuronitis, chronic suppurative otitis media, Meniere's disease, cervical spondylosis, drug induced vertigo due to administration of aminoglycosides, frusemide etc. Systemic problems such as long-standing diabetes, hypertension etc. may also be a causative factor. Vertigo as a psychosomatic manifestation should be ruled out. If the entire list of common causes is excluded by clinical examination and investigations, the vertigo may be termed as idiopathic.

Salient features

- Sensation of patient spinning or the environment spinning around him in a specific and fixed direction.
- Spontaneous nystagmus (most important physical sign) in primary position with eyes looking straightforward.

- Examination of the ear and audiometry is must to rule out any local cause and associated hearing loss.
- Specific vestibular function tests may be done in cases of suspicion of benign positional paroxysmal vertigo (BPPV) i.e. Hallpike manoeuver; and Fistula test in case a perilymph fistula is suspected.

Important notes

Axioms for defining a dizzy spell as vestibular: If the patient in a significant spell does not have spontaneous labyrinthine nystagmus, and also if the dizziness has been non-episodic and continuous for two or three months, then this dizziness cannot be vestibular.

Treatment

Nonpharmacological

1. Reassure the patient and in cases where positional vertigo cannot be ruled out, advise the patient to take complete rest with minimal movements only.

Pharmacological

1. Tab. Cinnarizine 25 mg three times a day till resolution of symptoms.

   Or

   Tab. Betahistine 8 mg three times a day.

   Or

   Tab. Prochlorperazine 25 mg three times a day.

The duration of drug administration depends on the disease entity as well as the persistence of symptoms.

If patient has acute, severe nausea and vomiting:

Inj. Prochlorperazine 25 mg by deep IM injection stat, may be repeated after eight hours, if required.

If there is no response to medical treatment -

- Refer to ENT specialist for Canthrone-Cooksey exercises. These are special exercises which facilitate the process of adaptation of the vestibule.
- Meniere's disease for surgery to eliminate the offending labyrinth.

Patient education

- Explain that the antivertigo drugs are likely to cause sedation

References

1. Vertigo. In: Scott Brown's Otolaryngology, J.B. Boothy(ed), 6th Edition, Vol 3, 1997.

JAUNDICE

Jaundice is defined as yellow discoloration of skin, sclera and tissues caused by increased levels of circulating bilirubin. Approximately 250-350 mg of bilirubin is formed daily, mostly from the breakdown of aged RBCs (70-80%) and rest from other haem proteins in the marrow and liver. It is taken up by liver, conjugated and excreted in bile. Serum bilirubin may increase due to dearrangement occurring at any level:

- Increased production due to excessive haemolysis, results in unconjugated hyperbilirubinaemia (>80% unconjugated serum bilirubin), jaundice is mild (bilirubin <10 mg%) and associated with absence of bilirubin in urine (achlouric jaundice).
- Impaired conjugation in hepatocellular damage (usually results in increase in both fractions of bilirubin due to impaired conjugation and associated decreased canalicular excretion).
- Impaired excretion due to intra- or extra-hepatic cholestasis, resulting in conjugated hyperbilirubinaemia (>50% conjugated serum bilirubin), associated with absence of urobilinogen and bile salts in urine.

Common causes of jaundice in clinical practice include acute viral hepatitis, alcoholic hepatitis, chronic hepatitis/cirrhosis, gall stones and malignancy of gall bladder/pancreas or extra-hepatic biliary system. Chronic haemolytic anaemias are less common and usually present in childhood or some time in young adults.

Approach to diagnosis of jaundice includes initial differentiation between the three types of jaundice by appropriate clinical history, examination and investigations including full blood counts, liver function tests (LFTs), viral markers, ultrasound examination of liver and biliary tract and if indicated CT scan of abdomen/ERCP.

Treatment of acute viral hepatitis is detailed below:

ACUTE VIRAL HEPATITIS

Acute viral hepatitis is caused by hepatitis virus A, E (faeco-orally transmitted) or B, C (parenterally transmitted).

Salient features

- Clinically, the onset is with a prodromal phase (nausea, vomiting, anorexia, fever, dull aching pain in upper right abdomen)

followed by icteric phase (appearance of jaundice in 3-7 days of onset, associated with improvement in nausea and return of appetite) followed by convalescent phase when jaundice gradually settles.

- The total duration of episode usually lasts for 2-6 weeks. Convalescent phase may be complicated by cholestatic phase when levels of conjugated bilirubin may increase and may take several weeks to improve.
- Diagnosis is confirmed by detection of IgM antibodies to different viruses (A, E & B) or detection of HCV RNA.

Treatment

Nonpharmacological

During prodromal phase, adequate intake of fluids should be maintained. Once the appetite improves patient should be advised to take normal diet (fat restriction or giving high carbohydrate has no advantage).

Indications for hospitalization are: severe prodromal symptoms causing dehydration, presence of early signs of hepatic encephalopathy (e.g. altered sensorium, disturbed sleep pattern, flapping tremors), decreased liver span on examination.

Pharmacological

1. Tab. Domperidone 10 mg SOS (maximum 3 times a day).
   Or
   Tab. Mosapride 5 mg SOS (maximum 3 times a day).
   Or
   If patient has severe nausea or vomiting.
   Inj. Metoclopramide 10 mg 3 times a day IM or IV.
2. IV fluids as required in case of uncontrolled nausea or vomiting.

Follow up/monitoring

- Repeat LFT at weekly interval.
- Patient can resume activity when the enzyme levels have come down to less than 3-5 times normal.
- In patient with HBV infection, check for disappearance of HBs Ag at 3-6 months.

Patient education

- Explain the relatives to report and hospitalize the patient if there is alteration in behaviour or sensorium of patient.
- There is no need to isolate the patient.
- Pregnant woman in contact with patient should be given normal human immunoglobulins.
- Patient should avoid taking alcohol for 4-6 months after recovery.

- Spouse of the patient with acute viral hepatitis (B), should use barrier method to prevent sexual transmission.

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TUBERCULOSIS

Tuberculosis (TB) is one of the most prevalent chronic infection in our country and responsible for high morbidity and mortality. TB is caused by *Mycobacterium tuberculosis,* and afflicts the lungs most commonly. In one-third or more extra-pulmonary involvement is seen.

Salient features

- Pulmonary TB presents usually with fever, malaise, chronic cough with sputum production, anorexia and weight loss. Sometimes chest pain and haemoptysis may be the presenting symptoms.
- Extra-pulmonary tuberculosis presents most commonly as prolonged fever and cervical, mediastinal or mesenteric lymphadenopathy.
- Abdominal tuberculosis may present as ascites, chronic abdominal pain, diarrhoea, recurrent subacute intestinal obstruction etc.
- CNS tuberculosis presents as chronic meningitis, seizures or focal neurological deficits.
- Skeletal tuberculosis may present as Pott's spine, tuberculous osteomyelitis, monoarticular arthritis.
- Constrictive pericarditis presents with edema/ascites.
- Symptoms of genitourinary TB includes tubovarian masses, secondary amenorrhoea in women, chronic epididymo-orchitis in men and painless haematuria in both the sexes.
- The diagnosis of pulmonary TB is usually made by suggestive radiological abnormalities. However, definitive diagnosis is made only by demonstration of AFB on smear or culture of the sputum or bronchial secretions. The definitive diagnosis of extra-pulmonary tuberculosis is made on the basis of FNAC or biopsy

findings of caseous granuloma with presence of AFB in the tissue although ultrasonography and radiological examination of the system involved are useful investigations. The patient based data is required for defining the role of PCR.

- Childhood tuberculosis is suspected when an ill child has a history of chronic illness that includes cough and fever, weight loss or failure to thrive, an inability to return to normal health after measles or whooping cough, and history of contact with an adult case of pulmonary tuberculosis. The diagnosis of tuberculosis in children is extremely challenging due to relative inability to demonstrate AFB- the gold standard.
- Once a decision to treat tuberculosis has been taken, it is important to define the disease under the following headings in order to prescribe the correct therapy and for the purpose of reporting:

Site of lesion: This is of importance when a more intensive treatment is suggested for certain sites e.g. pulmonary compared to extra-pulmonary or a prolonged continuation therapy may be required for certain extra-pulmonary disease like tuberculous spine or tuberculous meningitis.
Bacteriology: The treatment of tuberculosis is based on the dictum – more the bugs, more the drugs. So the AFB positive patients get higher number of drugs (initial 4 drug regime).

Type of patient

- All patients who have never been treated with antitubercular therapy (ATT) or for a period of less than 4 weeks in the past are- new cases.
- Certain sets of patients listed below are more likely to have drug resistant disease and therefore require a different and more powerful regime (Initial 5 drugs and 3 drugs in continuation).
  - ***Defaulter*** - Patient who was previously inadequately treated patient.
  - ***Relapse*** - Patient who has been previously completely treated/ cured patient now with active disease.
  - ***Treatment failure*** - Patient who, while on treatment, remained or again became smear positive 5 months or later after commencing treatment or patient who was smear negative before starting the therapy, but becomes smear positive after 2 months of treatment.
    In Children after 3 months of intensive phase therapy if patient does not show signs of recovery or deteriorates and where alternative diagnosis has been ruled out and compliance is ensured, it should be considered as treatment failure even if AFB has not been demonstrated.

- Severity of lesion.
  - Bacteriologically positive pulmonary tuberculosis is considered as severe disease. The bacteriologically negative pulmonary primary complexes, isolated lymphadenitis or pleural effusions are considered less severe.
  - Following types of bacteriologically negative cases are also considered to have severe disease: extensive pulmonary lesions, and disease of the organs which can cause severe morbidity or mortality *e.g.* meningitis, miliary, spinal disease, pericardial effusion, bilateral or extensive pleural effusions, peritonitis, intestinal and genitourinary tuberculosis.
  - Severe cases get 4 drug intensive phase compared to 3 drug for the others.

Treatment

Nonpharmacological

- High protein diet, however, routine use of vitamin supplements is not required.
- Rest, depending upon patient's symptoms.

Pharmacological

Nonspecific

1. Tab. Paracetamol 500 mg 6-8 hourly till fever resolves.
2. Symptomatic treatment depending upon site of involvement, e.g. Loperamide for chronic diarrhoea, anti oedema measures for raised intracranial pressure.

Specific

Adults: Short course regimen – 2 months initial phase of INH(H), Rifampicin (R), Ethambutol (E) and Pyrazinamide (Z) i.e. 4 drugs (HRZE) for 2 months, followed by 2 drugs (HR) for 4-5 months.

When initial drug resistance is suspected, Inj. Streptomycin (S) 15 mg/kg/day, with a maximum of 1 g/day may replace ethambutol.

In children

- Children can tolerate much higher doses than the adults so while calculating the dose, do not round off to a lower amount of drug. As children can have significant increase in body weight on treatment, the doses may be increased in proportion of body weight increase.
- With increasing experience with usage of ethambutol in children, now it is felt that the drug can be used for childhood tuberculosis as the risk of optic neuritis is quite low if the drug is used in doses upto 20 mg/kg/day.

Recommended regimens for treatment of childhood tuberculosis (adapted

from WHO regimes)

A. New Cases with primary complex, isolated lymphadenitis and pleural effusion.
   2HRZ + 4HR i.e., 2 months of intensive phase (IP) therapy with HRZ and 4 months of continuation phase (CP) therapy with HR.

B. New cases:
   a. Bacteriologically positive pulmonary tuberculosis.
   b. Severe extrapulmonary or pulmonary disease (see above), irrespective of AFB status.

   2(3) HRZE + 4HR* - IP extendable by 1 month for the patients who fail to convert bacteriologically or still having active disease after 2 months of initial therapy.
   *Intracranial/meningeal tuberculosis, spinal tuberculosis, tuberculous osteomyelitis may be treated for a longer period of 9 months 2HRZE + 7HR

C. Retreatment cases (relapses/defaulters/failures) 2SHRZE + 1 HRZE + 5HRE.

Table 1. ***Drug dosage charts for the anti-tuberculosis drugs***

Drug	Formulations	Dosage mg/kg/day	Route, Frequency
INH (H)	Tab. 100 mg, 300 mg Syrup 100 mg/5 ml	5-10	Oral, Once a day
Rifampicin (R)	Cap 150,300,450,600 mg Susp. 100 mg/5 ml	10	Oral, Once a day Empty Stomach
Pyrazinamide (Z)	Tab. 500, 750, 1000 mg, Syrup 300 mg/5 ml	25-35	Oral, Once a day
Ethambutol (E)	Tab. 200,400,800,1000 mg	20	Oral, Once a day
Streptomycin (S)	Tab. 500 mg, 750 mg Inj.1 g vials	20-40	Intramuscular, Once a day

Treatment in special situations

- **Re-treatment (susceptibility testing NA)** SHRZE for 3 months, followed by EHR for 5 months.
- **Intolerance to H** RZE for 2 months followed by RE for 7 months.

- **Intolerance to R** HEZ (S) for 2 months followed by HE for 16 months.
- **Intolerance to Z** HER for 2 months followed by HR for 7 months.
- **Resistance to H and R** EZ + Ofloxacin 400 mg BD or Ciprofloxacin 750 mg BD for 12-18 months.
- **Resistance to all first line drugs** Request drug susceptibility testing.

– Inj. Streptomycin/Kanamycin/Capreomycin 0.75-1 g/OD (10-15 mg/kg/day) + 3 of the following four drugs:
Tab. Ethionamide 250–500 mg BD, Cycloserine 15 mg/kg/day as BD dosage, Ofloxacin/Ciprofloxacin, PAS granules 4 g 8 hourly for 24 months.

Treatment of relapse

- 5 first-line drug regimen as mentioned earlier.

Treatment of MDR tuberculosis

- Very important to prevent MDR by avoiding monotherapy/poor compliance to treatment.
- Drugs susceptibility testing should be done. If not available, treatment regimen as above.

Patients with meningitis, bone and joint tuberculosis and miliary TB should receive minimum of 12 months of treatment.

Pregnant women

Avoid Z, S.

HRE for 2 months followed by HR for 7 months. Lactating women can continue to breast feed.

Patients with renal disease

- Avoid aminoglycosides.
- Avoid E and monitor for side effects.
- Reduce doses of H, Z in cases of severe renal failure.

Patient with hepatic disease

Avoid H, R, Z.

Silico tuberculosis

Increase duration of treatment by at least 2 weeks.

Patients with HIV/AIDS

- May need prolongation of treatment if response is inadequate.
- Avoid rifampicin in patients on protease inhibitors.

Patients with pericardial effusion, severe pleural effusion, meningitis

Steroid (oral/injectable) to be given along with the antitubercular therapy.

- **In tubercular meningitis**
  – Inj. Dexamethasone 12 mg/d for 2 weeks, gradual tapering over next 4 weeks depending upon the response.
- **TB pericarditis**
  – Tab. Prednisolone 40-60 mg for 2 weeks with gradual tapering over next 4 weeks.

- **Pleural effusion**
  – Tab. Prednisolone in same dose as above, in patients who are toxic or with large effusions.

DOTS therapy is a part of Revised National TB Control Programme (RNTCP) - 2 RHZE+4 RH drug is administered 3 days in a week in the designated DOTS centre in the presence of the doctor.

Assessment of response to therapy

a. The short course chemotherapy as enlisted above leads to a rapid clinical response in most patients in 2-4 weeks. Inadequate combination or dosage of this can lead to emergence of resistance and should be avoided at all cost.

b. The response to therapy should be monitored by bacteriological conversion in positive cases and by other markers like clinical and/or radiological improvement in AFB negative cases at the end of 2 months of intensive phase. A bacteriological conversion in over 80% of cases after 2 months of therapy is expected. If the patient continues to excrete bacteria after 2 months, the intensive phase needs to be extended by a month, and also ensure patient compliance, as non-adherence is the most common cause for non-response.
   If a patient continues to be symptomatic or bacteriologically positive after an extended phase of IP, then the patient should be extensively reevaluated and treatment failure/drug resistance should be suspected. The patient should be referred to a higher centre for further management. Remember persistence or recurrence of symptoms or radiological shadow could be due to secondary or co-infection with other organisms or due to a non tuberculous lesion. Radiologic response may lag behind bacteriologic cure and hence should not be the deciding factor for stopping of treatment. In patients with extrapulmonary tuberculosis, the response to treatment is assessed clinically.

c. All patients should have baseline LFTs and it should be monitored regularly in patients at high risk of hepatitis e.g. old patients, alcoholics, diabetics and malnourished.

d. Monitoring and management of side effects: The suggested therapy is usually well tolerated. However, some patients can develop GI intolerance, vomiting etc. for which only symptomatic therapy is required. Commonest major side effect with suggested regime is drug induced hepatitis. The easily recognisable symptom of high coloured urine in jaundiced patient is masked due to discolouration of urine because of rifampicin. Suspect hepatitis if vomiting is persistent and associated with anorexia. Clinically, icterus may be evident. In such a situation, stop the treatment and refer to a higher center.

In most patients the drugs can be reintroduced after the hepatitis has resolved. Pyrazinamide induced arthralgia or arthritis usually responds suitably to analgesic therapy. Drug rash and hypersensitivity is a major side effect where patient needs to be referred to a higher center. Peripheral neuropathy due to INH is treated with oral vitamin B6. Ethambutol can cause optic neuritis particularly when used in high doses and requires omission of the drug once this side effect occurs.

e. In case of hypersensitivity reaction, discontinue all drugs, re-challenge with individual drug to determine the likely offending drug. Do not reintroduce rifampicin in patients who develop thrombocytopenia. Hyperuricemia can occur due to pyrazinamide. Needs to be discontinued only in case of secondary gout.

Patient education

- Rifampicin colors the urine as well as other body secretions red. Patient must be warned about this to avoid unnecessary alarm. The patient should also be advised to take rifampicin empty stomach and not to take any meals for about 1 hour afterwards for good absorption of the drug.
- The patient or the primary caregiver must be advised regarding the probable side effects and explained when to contact the treating doctor.
- A health functionary should preferably supervise the treatment of tuberculosis as far as possible. However, it is of utmost importance that the patient and the family is informed about the need to complete all the treatment for whole of the duration. They must be explained the need for prolonged therapy even after the sickness disappears (symptoms abate). Inadequate or incomplete treatment increases the chance of multi drug resistance which is difficult to treat.
- A survey of the family/household contacts should be done to trace the infecting open case and other diseased in the family.
- Proper sputum disposal and personal hygiene (covering the mouth while coughing) should be explained for infectious patients.
- The fears of the patient and/or the caregiver regarding the disease should be removed as this disease has a lot of social stigma.
- Ethambutol is a hygroscopic drug which tends to crumble if not properly stored, particularly during rainy season.

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MALARIA

Parasitic infection due to protozoa of genus *Plasmodium* transmitted by the female Anopheles mosquito. There are four plasmodia species: *P. falciparum, P. vivax, P. malariae, P. ovale.*

Salient features

- Malaria is an acute and chronic protozoan illness characterized by paroxysms of fever, chills, sweats, fatigue, anaemia and splenomegaly.
- Falciparum malaria (severe and complicated malaria) is associated in varying degrees with the following clinical signs:
  Cerebral: mental clouding, coma, convulsions, delirium and occasionally localizing signs
  Hyperpyrexia (>40.5°C)
  Haemolysis, oliguria, anuria, pulmonary oedema and macroscopic haemoglobinuria
- Diagnosis is made by presence of protozoa in the blood in thick and thin smear slides. Thick smear for easy detection of parasite and thin smear for identification of species. Note that blood films may be negative even in a severe attack because of sequestration of parasites in the deep capillaries.

Principles of therapy

1. All fever cases without any other obvious causes should be presumed as malaria cases and antimalarial drug be given preferably after taking blood smear.
2. Chloroquine is the main antimalarial drug and it is to be used as first line of treatment for the treatment of uncomplicated malaria.
3. In high-risk areas presumptive treatment 25 mg/kg of Chloroquine base is to be given on 3 consecutive days with a single dose of Primaquine 0.75 mg/kg on the first day. High risk area is defined as follows:
   (i) Recorded deaths due to malaria (on clinical diagnosis or microscopic confirmation) with P. falciparum infection during the transmission period in an endemic area during any of the last 3 years.

(ii) Doubling of slide positivity rate (SPR) during the last 3 years provided the SPR in second or third year reaches 4% or more or the average SPR of the last year is 5% or more.

(iii) P. falciparum is 30% or more provided SPR is 3% or more during any of the last 3 years.

(iv) An area having a focus of chloroquine resistant P. falciparum.

4. In the low risk areas, presumptive treatment 10 mg/kg Chloroquine single dose.
5. Resistance should be suspected if inspite of full treatment and no history of vomiting and diarrhoea, patient does not respond within 72 hours parasitologically. Such patients should be given alternative drug i.e. Sulfa-pyrimethamine (S-P) combination.
6. S-P combination is the antimalarial drug of choice in *P. falciparum* resistant to chloroquine. The dose is 25 mg/kg of sulfa + 1.25 mg/kg of pyrimethamine which is 3 tablets for the adult (single dose).
7. The dose of Primaquine for *P. vivax* cases is 0.25 mg/kg daily for 5 days to prevent relapse and for *P. falciparum* 0.75 mg/kg single dose for gametocidal action.
8. Mefloquine can be given to chloroquine/other antimalarial resistant uncomplicated *P. falciparum* cases only.
9. Resistance to Chloroquine
   - There must be an evidence of falciparum positive blood slide on the first and third days of treatment. WHO classifies resistance to chloroquine into 3 types.
   - R1: total disappearance followed by reappearance of the parasite.
   - R2: noticeable fall without disappearance of the parasite.
   - R3: parasite level almost unchanged, indeed, increased.

   Before labeling resistance verify
   - that treatment has in fact been taken.
   - that the correct dose for weight has been prescribed.
   - the patient has not vomited within 30 min of taking medication.
   - that there has not been under-dosage due to confusion between the expression of the dosage as a chloroquine base and as a chloroquine salt. Equivalence between salt and base:

   130 mg sulphate=150 mg phosphate or diphosphate = 100 mg base.
   200 mg sulphate=250 mg phosphate or disphosphate= 150 mg base.
10. In Pregnant woman and infants, primaquine is contraindicated. As no data is available to suggest the safety of artemisinin derivatives in this group, the same is not recommended.

Treatment

Patients of uncomplicated malaria can be managed at primary level but patients with severe malaria with complications should be admitted and

managed in a hospital where facilities for detailed investigations and blood transfusion exists.

A. Presumptive treatment in uncomplicated malaria

Low Risk Area: Single dose of Tab. Chloroquine phosphate 10 mg/kg, (maximum dose is 600 mg) to all suspected malaria cases.

High Risk Area

Chloroquine base	Day 1	10 mg/kg	(600 mg adult)
Primaquine	Day 1	0.75 mg/kg	(45 mg adult)
Chloroquine base	Day 2	10 mg/kg	(600 mg adult)
Chloroquine base	Day 3	5 mg/kg	(300 mg adult)

B. Confirmed cases of malaria

1. Tab. Chloroquine as in presumptive treatment in "high risk area".
2. (a) In *P. vivax* Tab. Primaquine 0.25 mg/kg/day for 5 days.
   (b) In *P. falciparum* Primaquine 0.75 mg/kg as a stat (single dose).

In high risk areas where presumptive treatment with 500 mg Chloroquine base and 45 mg Primaquine (adult dose) has been given, Chloroquine need not be administered again, but Primaquine must be given for 5 days.

C. Chloroquine resistant *P. falciparum* case: In *P. falciparum* cases not responding to chloroquine, second line of treatment must be given as a single dose of Sulphalene/Sulphadoxine (1500 mg) + Pyrimethamine (75 mg) in dose of 25 mg/kg of Sulpha (3 tablets in adults) followed by Primaquine (45 mg).

D. In severe and complicated malaria cases

In severe and complicated *P. falciparum* malaria, irrespective of chloroquine resistance status of the area

Inj. Quinine salt 10 mg/kg 8 hourly IV in 5% dextrose saline is preferred. Patients should be switched over to oral quinine as early as possible and oral dose 10 mg/kg 8 hourly not exceeding 2 g in a day in any case. Minimum total duration for quinine therapy should be for 7 days including both parenteral and oral doses.

Or

In nonpregnant adults and in case of G-6 PD deficiency (capsule and tablet forms of these derivatives are not recommended for use in India)

Artemisinin derivatives (any of the following)

Dosages are as follows:

Inj. Artemisinin: 10 mg/kg once a day IV for 5 days, with a double divided dose administered on the first day;

Inj. Artesunate: 1 mg/kg (two doses) IM/IV at an interval of 4-6 hours on the first day followed by 1 mg/kg once daily for 5 days.

Inj. Artemether: 1.6 mg/kg (two doses) IM at an interval of 4-6 hours on the first day followed by 1.6 mg/kg once daily for 5 days.

Inj. Artether: 150 mg daily IM for 3 days.

Supportive treatment

Treat fever, hypoglycemia, electrolyte imbalance, hypotension, renal failure, anaemia, convulsions appropriately (for details see respective sections).

Chemoprophylaxis in selective cases

Chemoprophylaxis is recommended for a) pregnant women in high risk areas and b) travelers including service personnel who temporarily go on duty to high malarious areas. Chemoprophylaxis is to be started a week before arriving to malarious area for visitors and for pregnant women prophylaxis, it should be initiated from second trimester.

Chloroquine sensitive area

- Start with loading dose of Tab. Chloroquine 10 mg/kg, followed by a weekly dose of 5 mg/kg. This is to continue till 1 month after delivery in case of pregnancy and in travelers till one month after return from endemic area. The terminating dose should be 10 mg/kg along with 0.25 mg/kg of Primaquine for five days.

  (CAUTION: In pregnancy, Primaquine should not be given)
- Chemoprophylaxis with chloroquine is not recommended beyond 3 years because of its cumulative toxicity.
- **In chloroquine resistant areas** Chloroquine 5 mg/kg weekly and Proguanil 100 mg daily.

Patient education

- To take measures to stop mosquito breeding and protection from mosquitos e.g. mosquito nets, repellents, long sleeves, long trousers etc.
- Fever without any other signs and symptoms should be reported to nearest health facility.
- Chloroquine should be given with plenty of water after food and not on empty stomach. If chloroquine syrup is not available for children, the tablet should be crushed and given with honey or thick syrup.
- Watch for side effects of drugs prescribed. Chloroquine may cause nausea, vomiting and diarrhoea, mild headache and skin allergy/rash.
- If vomiting occur within 30 minutes of chloroquine intake repeat the dose of chloroquine.
- Chloroquine and sulphadoxine + pyrimethamine should not be given if patient is suffering from G-6 PD deficiency.
- Patients should be educated about symptoms of cerebral malaria, and should seek medical help immediately on occurance of these symptoms.

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DENGUE

Dengue is the most important emerging tropical viral disease of human beings in the world today. All four dengue virus (Den 1, 2, 3 and 4) infections may be asymptomatic or may lead to undifferentiated fever, dengue fever (DF), or dengue haemorrhagic fever (DHF) with plasma leakage that may lead to hypovolemic shock, dengue shock syndrome (DSS).

Salient features

- Dengue fever is an acute febrile illness of 2-7 days duration with two or more of the following manifestations: headache, retro-orbital pain, myalgia/arthralgia, rash, haemorrhagic manifestation (petechiae and positive tourniquet test) and leukopenia.
- Dengue haemorrhagic fever (DHF) if one or more of the following are present: positive tourniquet test, petechiae, ecchymosis or purpura, bleeding from mucosa, injection or other sites, haematemesis or melena, thrombocytopenia (platelets 100,000/cu.mm or less) and evidence of plasma leakage.
- Dengue shock syndrome (DSS). All the above criteria of DHF plus signs of circulatory failure.

Note: The tourniquet test is performed by inflating a blood pressure cuff to a point mid-way between the systolic and diastolic pressures for five minutes. A test is considered positive when 10 or more petechiae per 2.5 cm^2 (inch) are observed. In DHF, the test usually gives a definitive positive result (i.e., >20 petechiae). The test may be negative or mildly positive during the phase of profound shock.

Treatment

DF/DHF has an unpredictable course. A patient can progress from DHF to DSS and depending on the stage of the disease when the patient reports, a mixed picture can be seen. Most patients have a febrile phase lasting 2-7 days followed by a critical phase (2-3 days), during this phase, the patient is afebrile and is at risk of developing DHF/DSS.

DF and DHF during febrile phase

Nonpharmacological

Rest

Pharmacological

1. Tab. Paracetamol 500 mg 6 hourly (not more than 4 times in 24 hours) (for details see section on fever).
   (CAUTION: No role of antibiotic; do not give aspirin or ibuprofen)
2. ORS in patients with dehydration.
   To report immediately if patient develops any of the following danger signals: severe abdominal pain, passage of black stools, bleeding into the skin or from the nose or gums, sweating and cold skin.

Dengue haemorrhagic fever grade I (positive tourniquet test) and grade II (spontaneous bleeding) and thrombocytopenia <100,000, Hct rise ≥ 20%).

1. Immediate hospitalization.
2. As above in dengue fever.
2. Send sample for blood grouping and cross matching
4. IV fluids if patient has persistent vomiting or Hct rise >20%, continue IV fluids for 12-24 hours.

(CAUTION: IV fluid therapy before leakage is not recommended)

Monitor vitals and urine output on an hourly basis. Based on periodic haematocrit/platelet counts and vital signs, review and revise treatment.

DHF grade III (with circulatory failure) and grade IV (profound shock with undetectable blood pressure and pulse)

Immediately admit the patient to a hospital where trained personnel can manage shock and have blood transfusion facilities available (for management of shock, see section of shock).

If patient has already received about 1000 ml of IV fluids and vitals are still not stable, the haematocrit should be repeated and (a) if the haematocrit is increasing, IV fluids should be changed to colloidal solution preferably dextran or (b) if haematocrit is decreasing, fresh whole blood transfusion 10 ml/kg/dose should be given.

In case of continued or profound shock give colloidal fluid following the initial fluid bolus.

In case of persistent shock when, after initial fluid replacement and resuscitation with plasma or plasma expanders, the haematocrit continues to decline, internal bleeding should be suspected. It may be difficult to recognize and estimate the degree of internal blood loss in the presence of haemoconcentration. Give fresh whole blood in small volumes of 120 ml/kg at one time.

Give platelet rich plasma transfusion in exceptional cases when platelet

counts are below 5,000 - 10,000/mm^3. Monitor pulse, BP and temperature every 15-30 minutes.

After blood transfusion, continue fluid therapy at 10 ml/kg/h and reduce stepwise to bring it down to 3 ml/kg/h and maintain for 24-48 hours.

During convalescent phase (2-3 days) after recovery from crucial/shock stage advise rest, normal diet. Signs of recovery are stable pulse, BP and respiratory rate, normal temperature, no evidence of bleeding, return of appetite, no vomiting, good urinary output, stable haematocrit and convalescent confluent petechial rash.

Criteria for discharging patients

- Absence of fever for at least 24 hours without the use of antipyretic agents.
- Return of appetite.
- Visible clinical improvement.
- Good urine output.
- Minimum of three days after recovery from shock.
- No respiratory distress from pleural effusion and no ascites.
- Platelet count of more than 50,000/cu.mm.

Patient education

- Since this disease can rapidly become very serious and lead to a medical emergency, carefully watch for danger signs and immediately report to a doctor. Do not wait.
- The complications usually appear between the third and fifth day of illness
- Watch the patient for two days after the fever disappears.
- Give large amounts of fluids (water, soups, milk and juices) along with normal diet.
- All control efforts should be directed against the mosquitoes. Efforts should be intensified before the transmission season (during and after the rainy season) and during epidemics.

References

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EPILEPSY

The epilepsies are a group of disorders characterized by chronic, recurrent, paroxysmal changes in neurologic function caused by abnormalities in the electrical activity of the brain. Each episode of neurologic dysfunction is called a seizure. Isolated non recurrent seizures may occur in otherwise healthy individuals for a variety of reasons, and under these circumstances, the individual is not said to have epilepsy.

Salient features

A seizure (convulsion) is defined as a paroxysmal involuntary disturbance of brain function that may manifest as an impairment or loss of consciousness, abnormal motor activity, behavioural abnormalities, sensory disturbances, or autonomic dysfunction. Some seizures are characterized by abnormal movements without loss or impairment of consciousness.

- Diagnosis should be made by a description of the seizure(s) from the patient and witnesses about frequency, symptoms during and following attacks, duration, circumstances and trigger factors, injury, tongue biting and incontinence.
- Diagnostically relevant factors are seizure types, age of onset (many epilepsies are age-specific), family history, past history of head injury, febrile convulsions, precipitating factors, e.g. photic stimulation, alcohol and other drug intake, EEG for evidence of generalised or focal abnormality
- CT/MRI for evidence of structural lesion or idiopathic epilepsy or metabolic abnormality
- Consider differential diagnosis of vasovagal syncope and psychogenic non-epileptic attacks (pseudo seizures), migraine and breathholding spells etc.

Treatment

For immediate care during seizure (see section on Status epilepticus). Long term treatment is required for recurrent seizures. First episode of seizures with no previous history of same or other types of seizures and where neurological and metabolic diseases are ruled out, may be kept under observation unless parents/patients are not willing to take the risk. However, if patient presents with status epilepticus, Todd's palsy, strong family history of epilepsy and with abnormal EEG have a higher risk of recurrence and can be put on long term therapy. For alcohol withdrawal and metabolic or drug related seizures, long term treatment is considered only if there are recurrence suggestive of epilepsy. Treatment for seizures following head injury should be initiated after first seizure. However, duration of treatment depends on risk of late epilepsy.

Pharmacological

Generalised tonic clonic and partial seizures (simple and complex partial seizures)

Tab. Carbamazepine 10-35 mg/kg/day (600-1800 mg 3 times a day).

Or

Tab. Phenytoin 3-8 mg/kg/day in 2-3 divided doses.

Or

Tab. Valproic acid 15-40 mg/kg/day in 2 divided doses increasing by 200 mg at 3 days interval.

- Patient should preferably be controlled on a single drug (monotherapy)
- Start the drug with low dose. If seizure recurs, the dose can be increased after checking the compliance.
- If seizures remain uncontrolled despite reaching maximum dose of first drug, add another drug as above and gradually reach the maximum dose of second.
- If seizures are controlled by addition of second drug; always try withdrawal of first drug after few weeks of control of seizures.
- If seizures are not controlled with addition of second drug, the patient should be referred to a higher centre for further evaluation.

Generalised absence, myoclonic and akinetic seizures

Sodium valproate is the drug of first choice. In patients who do not achieve adequate seizure control on sodium valproate or do not tolerate, refer to a neurologist. The second choice depends on the seizure type and epilepsy syndrome.

Unclassified seizures (presenting under the age of 25 years) may be treated as generalized seizures.

Unclassified seizures (presenting above the age of 25 years) may be treated as partial seizures.

Age dependent epileptic encephalopathies (ADEE)

It includes early infantile epileptic encephalopathy, infantile spasms and Lennox Gastaut Syndrome (LGS) with onset within one month, 4-12 months and 1-6 years respectively. These are difficult to control and generally have associated mental defects.

Infantile spasms (myoclonic jerks, hyperarrhythmia on EEG and mental retardation)

1. Inj. ACTH 20-40 units/day.

   Or

   Tab. Prednisolone 2 mg/kg/day in 2-3 divided doses.
2. Syp. Sodium valproate 15-40 mg/kg/day in 2-3 divided doses.

   Inj. ACTH or Tab. Prednisolone is given for 2-4 weeks with gradual tapering while sodium valproate is continued (after seizures are controlled) for 2-3 years.

Lennox Gastaut Syndrome

For control of seizures multiple drugs may be required and treatment should be best carried out at a specialized centre.

Discontinuing drug therapy

Withdrawal of AED medication can be discussed with patients with idiopathic epilepsy after two years free of seizures. AEDs should be withdrawn over a period of 3-4 months because abrupt withdrawal may cause status epilepticus.

Surgery for epilepsy

Surgery should be considered for children with intractable seizures unresponsive to anticonvulsants. A precise localization of the epileptogenic area is essential. The EEG, SPECT (Single Photon Emission Computed Tomography) or PET (Positron Emission Tomography) can help in localization.

Patient/parent education

- Most parents are initially frightened by the diagnosis of epilepsy and require support and accurate information. The physician should anticipate questions, including inquiries about duration of the seizure disorder, side effects of medication and convulsions, aetiology, social and academic repercussions, and parental guilt.
- Parents usually wish to know if restrictions should be placed on the child and whether the teacher should be informed. Others inquire about the genetic implications, including the risk for future children.
- The parents should be encouraged to treat the child as normally as possible. For most children with epilepsy, restriction of physical activity is unnecessary except that the child must be attended by a responsible adult while the child is bathing and swimming.
- Most children with epilepsy are well controlled on medication, have normal intelligence, and can be expected to lead normal lives. However, these children require careful monitoring, as learning disabilities are more common in children with epilepsy than in the general population. Cooperation and understanding among the parents, physician, teacher, and child enhance the outlook for the patients with epilepsy.
- Counselling should also include first aid measures to be used if the seizure recurs.
- Patients should be instructed to avoid high risk activities like swimming, driving, roof tops, fire places etc. for at least 6 months after the last seizure.
- Explain that medications should be taken exactly as prescribed.
- Irregular intake of drugs or sudden stoppage can lead to status epilepticus and will also prolong the duration of the treatment.
- To report immediately in case of status epilepticus, if seizure frequency increases, develops any intermittent illness especially fever and behavioural problem.

- Young women on AED must consult doctor before conceiving.
- Explain possible long-term side effects of the AEDs: Phenytoin - gingival hypertrophy, hirsutism, acne, chloasma, coarsening of facial features, sedation and ataxia.
  Carbamazepine - Sedation, ataxia, diplopia.
  Valproic acid - Sedation, ataxia, diplopia and hair loss. Hepatotoxicity can occur in children.
- Explain special precautions to be taken with AEDs: In patients on valproic acid frequent liver function test to be done at beginning and first six months of drug therapy.
  For prevention of gum hypertrophy, patient should be advised to maintain good oral hygiene and frequent rinsing of mouth.
- In patients on AEDs - explain possible risk of drug interactions especially oral contraceptives and antitubercular drugs.

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STATUS EPILEPTICUS (SE)

Status epilepticus (SE) is an emergency condition associated with high morbidity and mortality if not treated early and effectively, however, about 12- 30 % of adult epileptics first present with status epilepticus as their frirst presentation. It often occurs in patients with preexisting epilepsy. SE can occur due to underlying metabolic disturbances, central nervous system (CNS) infections, head trauma and hypoxia.

Salient features

- Continuous seizures lasting for at least 5 minutes or two or more discrete seizures between which there is incomplete recovery of consciousness. Compensatory mechanisms start failing after 30 minutes resulting in hypotension, decreased

cerebral blood flow, normal or hypoglycemia, hypoxia and hyperpyrexia.

- Transient or early (0-30 minutes) physiological changes are hypertension, increased cerebral blood flow, hyperglycemia, hyperkalemia and lactic acidosis.

Treatment

Nonpharmacological

Immediately (within 5 minutes) give oxygen by nasal cannula or mask, position patient's head for optimal airway patency; patient should be transported in lateral position and clear the mouth from secretions/frothing. Rule out the treatable metabolic causes which can precipitate epilepsy by the following investigations: initiate ECG monitoring, establish IV access, draw venous blood samples for glucose level, serum chemistries, haematological studies, toxicology screens and determination of antiepileptic drug levels.

Assess oxygenation with pulse oximetry or periodic arterial blood gas determinations. If hypoglycemia is established or if blood glucose determination is not available, administer glucose, in adults, 25 % Dextrose IV - 50-100 ml stat (to be preceded by 50 mg IM Thiamine if patient is a known alcoholic). In children, the dose of glucose is 2 ml/kg of 25 % glucose.

Pharmacological

1. Inj. Lorazepam 0.1 mg/kg at the rate of 2 mg/min IV (can be repeated after 10-20 min).

   Or

   Inj. Diazepam 0.2 mg/kg at 5 mg/min intravenously (can be repeated if seizures do not stop after 5 minutes).
2. If seizures persist and diazepam was used to stop the status, also give

   Inj. Phenytoin 15-20 mg/kg slow infusion (not more than 50 mg/min).

   In children: Inj. Phenytoin 1 mg/kg/min IV.

   (CAUTION: Phenytoin is incompatible with glucose containing solutions; purge IV line with normal saline before administering phenytoin infusion; IM absorption is erratic).

   If seizures are not controlled after 20 mg/kg of Phenytoin even after 40 minutes, give additional dose of Phenytoin 5-10 mg/kg to a maximal of 30 mg/kg.

   (CAUTION: Check BP as it can produce hypotension)

If status persists after 60 minutes (Refractory SE)

Identify the precipitating or underlying cause of SE and institute treatment

accordingly and shift patient to a tertiary care hospital with a ICU or emergency care unit).

1. Intubate and ventilate patient, place EEG monitor, place arterial catheter and central catheter.
2. Inj. Phenobarbital 20 mg/kg IV at 50-100 mg/min (Risk of apnoea or hypopnea is high if given after diazepam).
3. If seizures persists after 10-15 minutes give additional dose of 5-10 mg/kg of phenobarbital.
4. If seizures persists after 70 minutes, give anaesthetic dose of
   Inj. Midazolam 0.2 mg/kg slow IV bolus followed by 0.5–2 mg/kg/h.
   Or
   Inj. Propofol 1–2 mg/kg bolus followed by 2–10 mg/kg/h.
   Or
   Inj. Pentobarbital 5–15 mg/kg over one hour followed by 0.5 -3.0 mg/kg/h.

Continuous monitoring of EEG with the primary end point being suppression of spikes or a burst suppression pattern with short inter burst interval.

Continue maintenance doses of phenytoin/phenobarbitone to avoid recurrence of SE. Taper infusion at 12 hours to observe for further seizure activity, restart infusion if seizure recurs. Simultaneously, identify and treat the underlying cause and give IV fluids and vasopressors (Inj. Dopamine infusion) to maintain the BP, if cardiovascular compromise occurs decrease dose of Midazolam/Propofol/Pentobarbitone.

Reduce dose and administration in cardiovascular disease, elderly, renal failure, hypoalbuminemia, monitor BP and cardiac rhythm.

Patient education

- Convulsive SE is a serious complication most often seen in patients with preexisting epilepsy & is most often precipitated by missing or discontinuing medication or associated medical illness.
- If patient continues to convulse for more than 5 min or does not regain consciousness after a seizure, the patient should be hospitalized.
- Patient should be transported in lateral position & mouth should be cleared from secretions/frothing.

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2
EMERGENCIES

CARDIOPULMONARY RESUSCITATION (CPR)

CPR consists of a series of manoeuvers by which oxygenated blood supply to brain and vital organs is maintained during cardiopulmonary arrest (CPA) i.e. cessation of respiration and circulation.

In children, CPA is not sudden but end result of long period of hypoxemia secondary to inadequate ventilation, oxygenation or circulation. Therefore, prompt management of these is essential to prevent CPA, the outcome of which is poor.

Diagnosis of cardiopulmonary arrest

Cardiac arrest

1. Absence of pulse in major arteries (carotid or femoral in older children and femoral or brachial in infants as here due to short neck, carotid is difficult to palpate).
2. Absence of heart sounds on auscultation.
3. Asystole /ventricular fibrillation on ECG.

Respiratory arrest

Absence of respiration on looking (absent chest movements), listening (absent air flow on bringing ears in front of mouth) and feeling (absent air flow on keeping hands in front of mouth or nose).

Levels of CPR. There are two levels of CPR:

1. **BLS (Basic life support),** The elements of CPR provided without additional equipment. Skill and speed are most essential.
2. **ACLS (Advanced cardiac life support),** Use of equipment and drugs for assisting ventilation or circulation. In addition to BLS, CPR should proceed in the following order:

a. Airway

i. Clear airway by cleaning blood, secretions, foreign particles (suction if available).

ii. Prevent posterior displacement of tongue due to muscle relaxation during CPA, by head tilt and chin lift (may use an airway if available).

Head tilt: Put a hand at forehead and tilt head back to sniffing or neutral position in an infant and little more in older children.

(**CAUTION:** In a patient with suspected cervical spine injury head tilt should be avoided.)

Chin lift: Put finger of other hand under bony part of lower jaw at chin and lift chin upward.

Jaw thrust: Place 2-3 fingers under each side of lower jaw at its angle and lift jaw upward with the elbow resting on the surface on which victim is lying.

Call for help

Position the victim supine on firm flat surface with head level with the heart.

b. Breathing

Determine the absence of breathing. Give mouth to mouth /nose/mask/ airway breath (may use bag and mask if available). Inhale and then make a seal around the mouth and nose together in an infant and seal mouth only in older child (nose pinched with the hand used for head tilt) to exhale smoothly .

Rate of breaths should be 20/min for infants;15/min in older child and 10-12 min in adults.

c. Circulation

Determine the absence of pulse after 2 breaths (rescue breaths). External cardiac massage if asystole or HR <60/min and unresponsive to rescue breaths.

Rescuer should stand or kneel at the side of the patient so that his hips are on a level with the victim's chest.

In a **newborn** 2 thumbs are positioned side by side on sternum just below the nipple line, with fingers encircling chest and supporting the back and compress sternum by 0.6-1.2 cm (120/min).

In an **infant** put index finger at the intersection of intermammary line and sternum. Use 2-3 fingers (index, middle and ring) to compress sternum by 1.5-2.5 cm (100/min) and do not lift the finger when compression is released.

In **children** (1-8 years) use heel of hand on lower half sternum with long axis of heel same as long axis of sternum and compress 2.5-3.5 cm (80-100/min).

In **adults** the heel of one hand is placed on the lower sternum and the other hand placed on top of the first. The elbows should be locked in position with the arms straight and the shoulders over the hands. Sternum should depress by 3.5-5.0 cm and the rate of compression should be 80 to 100/min.

(CAUTION: Do not exert pressure on the ribs, costal cartilages or xiphoid)

Combination of ventilation and cardiac massage

If both cardiac and respiratory arrest. Compression : ventilation = 5 : 1 if 2 rescuers and 15 : 2 if 1 rescuer.

Advanced cardiac life support (ACLS)

If ACLS facility is available, shift the patient to ACLS as soon as possible. If this is not available then continue cardiac massage till spontaneous HR is more than 60-80/min and continue artificial breathing till adequate respiratory efforts are present (good chest movement, no cyanosis or shock). For ACLS proceed in the following order:

1. **ECG monitoring** (if available)
   If ventricular fibrillation, defibrillation
   In adults: First shock at 200 Joules; if the first is unsuccessful then a second shock at 200-300 Joules. If both fail, additional shocks at 300-600 Joules are given.
   In children: 2 Joules/kg and can be repeated a few times if does not revert to normal rhythm). Continue cardiac massage in the mean time.
2. All patients require oxygen (100%) because even with best CPR only a fraction of the cardiac output is provided and also there are other factors causing ventilation perfusion mismatch.
3. Establish IV line as early as possible to give drugs and fluids and intubation of trachea should be done to continue artificial ventilation.
4. **Drugs** are used in the following order if indicated.

Inj. Adrenaline

Indication:- Asystole, symptomatic bradycardia unresponsive to ventilation,
In adults: 1 mg IV every 3-5 minutes.
In children: 0.1 ml/kg of 1:10,000 solution (0.01 mg/kg) IV, intra-osseous or 0.1 ml/kg of 1:1000 solution by endotracheal tube followed by several positive pressure breaths. Can repeat every 5 min by either route. IV route is preferred and should be used as soon as IV access is achieved (intracardiac route is not desirable)

Inj. Lignocaine

Indication:- Ventricular tachycardia or fibrillation non responsive to or recurs after defibrillation.
In adults: Initial bolus dose is 1.5 mg/kg. Additional bolus of 0.5-1.5 mg/kg can be given every 5-10 minutes during CPR up to a total dose of 3 mg/kg.
In children: Inj. 1 mg/kg IV stat followed by infusion at 20-50 mcg/kg/min.

Inj. Amiodarone

Indication: Ventricular tachycardia (as an alternative to or after failure of lignocaine).
In adults: 150 mg over 10 minutes followed by 1 mg/min for upto 6 h and 0.5 mg/min thereafter.
In children: 5 mg/kg infusion over 30 min and then infusion of 5 mg/kg/day.

Inj. Atropine

Indication: Vagally mediated bradycardia during intubation, HR<80 or asystole in an infant and symptomatic bradycardia with AV block in any child.

0.02 mg/kg bolus (not <0.1mg or >0.5 mg for a child and 1.0 mg for an adult). This dose may be repeated after 5 minutes for a maximum total dose of 1.0 mg for a child and 2.0 mg for an adult.

Inj. Naloxone

Indication: Narcotic overdose or poisoning and newborn resuscitation (if mother has been given morphine or pethidine during labor).

Dose and route: 0.1 mg/kg IV.

Inj. Sodium bicarbonate ($NaHCO_3$)

Not required routinely as it can cause alkalosis later and worsen respiratory acidosis by releasing CO_2 in inadequate ventilation.

Indication:- Hyperkalemia, significant metabolic acidosis (pH <7.2) or prolonged CPR .

In adults and in children: Inj. Sodium bicarbonate 1 mEq/kg stat and 0.5 mEq/kg every 10 minutes in protracted resuscitation.

Inj. Calcium

Indication: Not used routinely now a days unless there is hyperkalemia, hypocalcemia or calcium channel blocker toxicity.

Dose and route: 0.5 ml/kg of calcium gluconate IV.

Inj. Glucose

Indication -Hypoglycemia.

Dose and route – 0.5-1 g/kg IV.

5. Try to get ABG, serum electrolytes and blood sugar (dextrose stick/glucometer)

Postresuscitation care

- Maintain mechanical ventilation for several hours to ensure adequate oxygenation and ventilation
- Look for and treat seizures.
- Inj. Mannitol 0.5-1 g/kg IV if raised intracranial tension.
- Maintain temperature, fluid and electrolyte balance and ABG.
- Treat shock with fluids, dopamine, dobutamine and adrenaline infusion as required.
- Treat the underlying pathology causing CPA.

Monitoring

Pulse should be palpable and chest expansion should be seen during effective CPR.

Blood pressure, SpO_2, Et CO_2 (in intubated patient and if facility available), ABG should be monitored during and soon after CPR.

Termination of CPR

If asystole persists for >10 minutes and ventricular fibrillation has been

eliminated, adequate ventilation provided and appropriate medications given.

Patient education

- Parents: They should know that many causes of CPA are preventable e.g. injuries (by providing safe environment), poisoning (by keeping drugs out of reach of children), foreign bodies (safe toys and avoid beads, balloons etc. and avoid eatables like peanuts in infants). They should closely supervise young children.
- General public should be trained in BLS.
- Health care workers: They should be able to recognise and refer emergencies in time, and also know about BLS.

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BURNS

Burns are a major preventable cause of morbidity and mortality. These can be caused by dry heat or space heating , moist heat-scalds and fat burns, ionizing radiation, electric burns, friction, chemicals and cold-frost bite.

Salient features

- Burns, pain, anxiety, fluid loss and dehydration, local tissue edema and infection.
- Early complications include shock, toxemia, sloughing of mucus membranes-gastrointestinal tract and respiratory tract, inhalational injuries, acute renal failure, and haematemesis (Curling ulcer).
- Late complications include, protein losing enteropathy, secondary haemorrhage, hypertrophic scar/keloid and contracture.

Treatment

Immediate resuscitation and care

- Clear airway, suspect inhalational injury if history of being trapped in close space, facial burns, singeing of eyebrows/nasal hairs, respiratory distress, hoarseness of voice or stridor, altered consciousness and soot in sputum.
- Check for breathing and circulation and provide support.
- Rule out other associated injuries.
- Insert nasogastric tube in all major burns.

Assess the severity of burns

Assessment includes calculation of surface area of burns: Rule of nine/ charts, depth of burns, location of burns, patient's age and presence of associated injury or disease.

Criteria for admission or transfer to a burns center

- Burns of more than 20% body surface area in an adult.
- Burns of more than 10% body surface area in a child under 10 or adult over 50 years.
- Burns of more than 5 % body surface area in an infant.
- Burns to head, face, neck or perineum.
- Respiratory burns or inhalational injury.
- Circumferential burns.

Transfer should be done in a fully equipped ambulance with secured airway and circulatory support.

General Management

1. Fluid resuscitation

Intravenous fluids to be infused through a wide bore cannula (lactated Ringer's solution) at the rate of 3-4 ml/kg/% burns area. Half of the volume calculated is infused in the first eight hours after the injury and the rest is infused in the next 16 hours (for details see section on fluid & electrolyte imbalance).

Adequacy of the fluid therapy is best assessed by measuring hourly urine output, which should be maintained at 30-50 ml per hour in adults and 0.5-1 ml/kg body weight in children. Infusion rate should be increased or decreased accordingly.

Other features to be assessed are pulse rate, respiratory rate, blood pressure and level of consciousness.

2. Pain relief

Cold compresses using fresh running water; avoid ice cold water.

Inj. Morphine sulphate (15 mg/ml) 10-15 mg stat and can be repeated after 4-6 hours.

3. **Care of the burns**
   - Clean the burns with running water except for the chemical burns.
   - Remove cloths, dirt, eschar.
   - Dressing: aims to minimize pain, absorb exudates and debris, shield the burns from secondary infection and provide protection during transport.
   - Fasciotomy in cases of circumferential burns in extremities or chest wall.
   - Application of cream- Silver sulphadiazine 1% or Silver nitrate or Framycetin 1%.
   - Physiotherapy-range of action movements to prevent contracture.
4. Inj. Ampicillin 500 mg 6 hourly IV.
   In children 50-100 mg/kg in 4 divided doses for 7-10 days.
   Or
   Inj. Ciprofloxacillin (Infusion 100 mg/50 ml), 500 mg 2 times a day for 7 days.
   Secondary infections are treated by appropriate antibiotics according to culture sensitivity results.
   Patient is advised to attend physiotherapy: use compression garments to prevent hypertrophic scars. Plastic surgeons advice may be required to correct contractures.

Home management of burns

- Burnt area should be kept under running cold water. Avoid ice cold water.
- Do not puncture the bullae.
- Apply silver sulphadiazine cream 1% Or Framycetin cream 1%.
- Cover with sterile dressing.
- Tab. Paracetamol 500 mg as and when required.

Scalds

Scalds may result from drinking extremely hot fluids or some irritant chemicals. In such cases, the inner side of the mouth and throat becomes red and swollen. Give cold water to drink or ice, followed by milk or egg emulsion to drink and refer the patient to a hospital.

Patient education

- Provide psychological support to the patient and relatives about the extent of burns, possible outcome and complications.
- Parents are educated about prevention of accidents and burns in future by taking necessary preventive steps at home.
- Transport of patient to health care center should be done at the earliest. The wound should be covered with a clean cloth.
- Inform the relatives about the medicolegal aspects of the injury and importance of evidence and dying declaration by the patient in case of homicidal burns or suspected dowry deaths.

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SHOCK

Shock is a state of acute circulatory failure that leads to tissue hypoxaemia.

Classification and causes of shock

1. Haemorrhagic shock

Traumatic

- Blunt or penetrating injury
- Fractures specially of long bones and pelvic fractures

Non Traumatic

- GI bleeds (e.g. peptic ulcer, gastric mucosal erosions, oesophageal varices, typhoid bleeds, bleeds in sepsis, DIC)
- Aortic dissection
- Rupture of aneurysm of a large vessel e.g. aorta
- Erosion of a large vessel e.g. in pancreatitis or due to tumour infiltration
- Diffuse inflammation of mucosal surfaces e.g. ulcerative colitis

2. Hypovolemic shock

- Fluid loss from vomiting and/or diarrhoea e.g. in cholera, other GI infections.
- Fluid loss in diabetes mellitus, adrenal insufficiency, excessive sweating, exfoliative dermatitis, diabetes insipidus, reaccumulation of ascites after tapping.
- Sequestration of fluid e.g. in intestinal obstruction, pancreatitis.
- Burns.
- Crush injuries.

3. Cardiogenic

- Acute myocardial infarction.
- Cardiomyopathy.
- Cardiac arrhythmias.
- Mechanical causes e.g. valvular disease, outflow tract obstruction, ruptured ventricular septum.

4. Distributive or vasogenic (relative hypovolemia)

- Septic shock; Toxic shock syndrome.
- Anaphylactic.
- Neurogenic.

Salient features

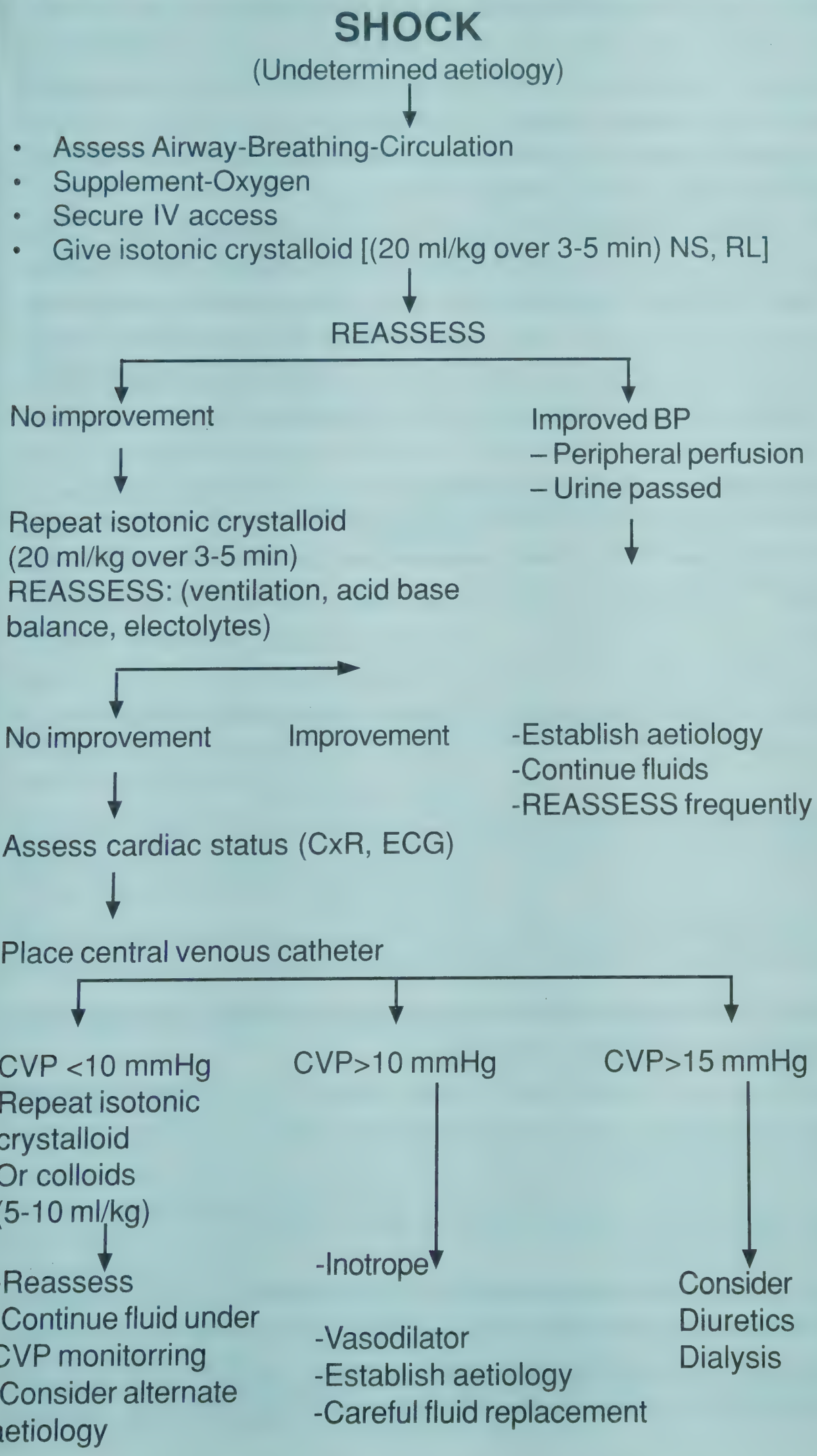
Shock is a progressive disorder which if untreated can lead to severe haemodynamic and metabolic deterioration finally causing multi-organ failure. Stages of shock can be arbitrarily classified as

- **Early compensated shock** - Vital organ function is maintained by intrinsic compensatory mechanisms. Blood pressure is usually normal, there is increasing tachycardia and hypotension. The skin is cold and clammy, increased capillary refill time (>3 sec). If there is delay in treatment it may lead to decompensated shock.
- **Decompensated shock** - There is fall in blood pressure and cardiac output. Features of peripheral poor perfusion are compounded with manifestations of vital organ impairment. Patient may have alteration of mentation (impaired cerebral perfusion), oliguria (renal hypoperfusion) and myocardial ischaemia (coronary flow impairment). Patient has acrocyanosis, cold and damp extremities and a pale look. If untreated it can progress to irreversible state of shock.
- **Irreversible shock** - is a term applied to the clinical situation in which even haemodynamic correction does not halt the progressive organ failure.

Treatment (Stepwise management)

1. Immediately start Oxygen therapy 4-6 L/min
2. Initial volume expansion measures. Venous access should be restored as early as possible (within 3-5 min). Peripheral veins should be tried first if failed then central veins like jugular/femoral can be used. Establish 2 wide bore IV lines and infuse crystalloids.
3. If venous access can not be achieved in a short period, intraosseous infusion can be given into the bone marrow by putting a bone marrow needle.
4. Nature of fluids: Normal Saline/Ringer's lactate (crystalloids) can be used initially in all types of hypovolemic/haemorrhagic shocks. Colloids are used in conditions with capillary leaks, burns, dengue fever, nephrotic shock. Whole blood can be used as replacement in cases of trauma and haemorrhagic shock, packed cells are used in burn patients.
5. Volume of fluids: boluses of 20 cc/kg should be pushed in 5-7 min to restore blood volume quickly through 3 way cannula.Features of recovery i.e. warm skin and improved capillary filling time appear very quickly after fluid replacement. If these do not appear give a 2nd bolus.
6. In case no improvement is seen and facilities for monitoring CVP are not available and there are no features of over-hydration, give another bolus and start ionotrope. If facilities for CVP are available modify fluid therapy and inotropes according to CVP as given in Figure 1.

Figure 1. ***Schematic outline of initial resuscitation of shock***



Monitoring

Fluid therapy in patients with hypovolemic shock will improve the peripheral perfusion and monitor pulse rate, respiratory rate, capillary filling time, blood pressure, sensorium and urine output. Final end points for volume resuscitation include warm skin, reestablishment of urine output to 0.5-1.0 ml/kg/hour, adequate capillary refill (<3 sec) and heart rate and blood pressure returning to normal range for that age.

Use of Inotropes - Inotropes are used to increase myocardial contractility. These are given as continuous intravenous infusions preferably with an infusion pump. Initial therapy is undertaken with either dopamine or dobutamine. Those who fail to respond, more potent agents like adrenaline and noradrenaline can be used. Dose of dopamine/dobutamine generally required is 5-10 mcg/kg/min, can be augmented to 20 mcg/kg/min (Table 1).

Table 1. ***Cardiovascular support drugs***

Drugs	Dose	Comment
Dopamine	5-20 mcg/kg/min	Effects are dose related and complex
Dobutamine	5-15 mcg/kg/min	Selective inotrope, little chronotropic, mild vasodilator
Adrenaline	0.05-1.0mcg/kg/min	Powerful vasoconstrictor, minimum increase in heart rate, used if other agents have failed
Noradrenaline	0.05-1.0 mcg/kg/min	Strong vasoconstrictor, mainly useful for prolonged hypotension, not responding to other agents

Note: Titrate infusion to desired haemodynamic effect.

Preparation of catecholamine infusions in infants and children can be done by following formula:

For Dopamine and Dobutamine 6 X body weight in kg is the dose added to sufficient diluent to create a total volume of 100 ml. 1 ml/h of this fluid will deliver 1 mcg/kg/min.

For adrenaline 0.6 X body weight in kg is used in similar diluent to deliver 0.1 mcg/kg/min.

Response to inotropes is measured in the same way as after fluid push. If patient shows better peripheral perfusion i.e. improved capillary filling time and warm extremities and blood pressure reaches within normal range, inotropes can be maintained for few hours, till underlying condition

shows features of reversal. If patient does not show signs of improvement, should be referred to a tertiary level centre where facilities for ventilation are available.

Metabolic corrections

Metabolic acidosis as a consequence of tissue ischaemia is the most important secondary complication. Correction is indicated only when marked acidosis (pH <7.2). Sodium bicarbonate 1-2 mEq/kg can be used initially but subsequent doses should be based on base deficient (mEq = body weight in kg x base deficit x 0.3).

Ventilatory support - may be required in critically sick patient showing signs of ventilatory fatigue/failure.

Cardiogenic shock

Cardiogenic shock is best viewed as pump failure and common causes are acute myocardial infarction in adults and dysrrhythmia in children.

Immediate treatment is same as mentioned above, however invasive monitoring and advanced life support systems are required, hence patient should be referred to a tertiary level centre after initial resuscitation. See section on arrhythmia/myocardial infarction for specific treatment.

Septic shock

Septic shock is a consequence of bacteremia most commonly gram negative organisms but gram positive and viral infections can also cause it. It follows trimodal pattern of haemodynamic presentation: warm shock, cold shock and multisystem organ failure.

Initial treatment is as above except volume replacement requirement may be more and aggressive antibiotic therapy should be started early. Disseminated intravascular coagulation (DIC) is a common complication and may require fresh frozen plasma and platelet transfusion, (see section on septicaemia for specific treatment).

For anaphylactic shock see section on Anaphylaxis.

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FLUID & ELECTROLYTE IMBALANCE AND REPLACEMENT (IN ADULTS)

Disturbances in fluid and electrolyte balance occur in a wide spectrum of diseases, are not confined to any particular field of medicine, and are common following burns, trauma and major surgery.

The conventional and easy method of evaluating disturbances in fluid and electrolyte balance is the frequent measurement of the concentration of serum electrolytes. It is crucial to remember that intracellular and extracellular electrolytes are normally constant, and that major shifts in and out of 'compartments' can occur in disease with minimal changes in serum electrolyte.

Compositional changes also involve disturbances in acid-base balance.

Volume changes: volume deficit

I. Obvious causes

Vomiting, diarrhoea, intestinal fistulae, nasogastric suction, fluid loss following burns, sequestration of fluid in soft tissue injuries and infections, diuretics, renal disease/adrenal insufficiency.

II. Less obvious causes

Unsuspected inadequate fluid intake fluid loss through excessive sweating as in high fever, hot humid temperatures, in diseases like tetanus. Fluid loss during haemodialysis, haemofiltration and from surgical incisions.

Management

The first principle is to restore circulating volume through infusion of intravenous fluids. Once this is satisfactorily achieved, disturbances in electrolytes and acid-base balance if present need to be rectified.

Various fluids used for volume replacement are given below:

A. Replacement fluids

1. Replacement fluids are used to replace abnormal loss of blood, plasma or other extracellular fluids as first line treatment for hypovolemia in:
   - Treatment of patients with established hypovolemia e.g. haemorrhagic shock.
   - Maintenance of normovolemia in patients with ongoing fluid losses e.g. surgical blood loss.
2. Intravenous replacement fluids are the first line of treatment for hypovolemia. Initial treatment with these fluids may be lifesaving and provide some time to control bleeding and obtain blood for transfusion if it becomes necessary.
3. Crystalloid maintenance fluids, which contain dextrose, are not suitable

for use as replacement fluids.Only crystalloid solutions with a similar concentration of sodium to plasma (normal saline or balanced salt) solutions, (Ringer's lactate or Hartmann's solutions) are effective as replacement fluids. These should be available in all hospitals where intravenous replacement fluids are used.

4. Crystalloids should be infused in a volume at least three times the volume lost in order to correct hypovolemia.
5. All colloid solutions (albumins, dextrans, gelatins and hydroxyethyl starch solutions) are replacement fluids. However, they have not been shown to be superior to crystalloids in resuscitation.
6. Colloid solutions should be infused in a volume equal to the blood volume deficit.
7. Plasma should never be used as a replacement fluid.
8. Plain water should never be infused intravenously. It will cause haemolysis and will probably be fatal.
9. In addition to the intravenous route, the intraosseous, oral, rectal or subcutaneous routes can be used for the administration of fluids, blood and certain drugs. However, with the exception of intraosseous route, other routes are generally unsuitable in severely hypovolemic patients.
10. Rectal fluids are administered through a plastic or rubber enema tube which is inserted into the rectum and connected to a bag or bottle of fluid. The fluid rate can be controlled by using a drip giving-set, if necessary.

    The fluids used need not be sterile. A safe and effective solution for a rectal rehydration is 1 litre of clean drinking water with teaspoon of table salt.
11. Subcutaneous fluids: Occasionally, when other routes of administration of fluids are unavailable, a subcutaneous infusion can be used. A cannula or needle is inserted into the subcutaneous tissue (the abdominal wall is a preferred site) and sterile fluids are administered in a conventional manner.

    Do not give dextrose-containing solutions subcutaneously as they can cause sloughing of tissues.
12. Oral and nasogastric fluids: Oral rehydration can often be used in mildly hypovolemic patients if the oral route is not contraindicated. Do not use if:
    - The patient is unconscious.
    - The patient has gastrointestinal lesions or reduced gut motility e.g. obstruction.

– General anaesthesia and surgery is planned imminently.

WHO/UNICEF formula for oral rehydration fluid

Dissolve in one litre of drinkable water

Sodium chloride (table salt)	3.5 g
Sodium bicarbonate (baking soda)	2.5 g
Potassium chloride or suitable substitute (degassed cola drink or banana)	1.5 g
Glucose (sugar)	20.0 g

Resulting concentrations

Na^+ 90 mmol/L, Cl^- 80 mmol/L, K^+ 20 mmol/L, Glucose 110 mmol/L

B. Maintenance fluids

Maintenance fluids are fluid used to replace the normal physiological loss that occur in a patient through skin, lung, faeces and urine. Since a considerable proportion of these losses is water, maintenance fluids are mainly composed of water in the form of a dextrose solution. Some electrolytes may also be included in these solutions.

All maintenance solutions are crystalloid solutions. Some examples of crystalloids that are suitable as maintenance fluids are: 50% dextrose and 4% dextrose in sodium chloride 0.18%

Table 2: ***Fluid & electrolyte requirements for adult & children under normal circumstances***

Weight	Fluid ml/kg/24 hours	Sodium mmol/kg/24 hours	Potassium mmol/kg/24 hours
Children			
First 10 kg	100 (4*)	3	2
Second 10 kg	50 (2*)	1.5	1
Subsequent kg	20 (1*)	0.75	0.5
Adults			
All weights (kg)	35(1.5*)	1	0.75

*These figures represent the fluid requirements in ml/kg/hour.

Safety

Before giving any intravenous infusion:

1) Check that the seal of the infusion fluid bottle or bag is not broken.
2) Check the expiry date.
3) Check that the solution is clear and free from visible particles.

VOLUME EXCESS

Volume excess is often iatrogenic when the fluid intake has consistently exceeded the output. Excessive intravenous infusions of saline, and blood transfusions are important causes of hypervolemia. Renal insufficiency, congestive heart failure, liver disease and other causes of sodium retention, or excessive sodium administration can all produce increase in extracellular fluid content and hypervolemia.

Salient features

- Oedema, ascites, pleural effusion, neck veins are full, pulmonary congestion, hyperdynamic circulation with tachycardia, a warm skin, and a bounding pulse.
- Increase in the systolic pressure and pulse pressure.
- CVP >12 mmHg, Pulmonary Capillary Wedge Pressure (PCWP) >20 mmHg in the presence of pulmonary oedema.

Treatment

In cases of moderate volume excess, salt restriction, restriction of fluid intake and the use of frusemide as a diuretic will solve the problem. Fulminant pulmonary oedema secondary to overhydration from overtransfusion of blood or fluids is more appropriately dealt with by phlebotomy in stages so that PCWP is reduced below 15 mm Hg. Rarely ultrafiltration (dialysis) may be required

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ANAPHYLAXIS

It is a generalized hypersensitivity reaction characterized by hypotension, peripheral circulatory collapse and respiratory difficulty in the form of stridor and dyspnoea. Anaphylaxis can occur due to food, inhaled/ ingested allergens or drugs. Symptoms may occur instantaneously or

within a few minutes after an intravenous injection of the offending agent. At times the reaction may develop after 1/2 - 1 hour of the exposure. Anaphylaxis to oral drugs may take 1-2 hours, but in many patients it can be instantaneous.

Table 3: ***Commonly used agents implicated in anaphylactic and anaphylactoid reactions***

1. Antibiotics
   - Penicillin and analogs
   - Sulfonamides
   - Tetracycline
   - Streptomycin
2. Local anaesthetics
   - Inj. Lidocaine
3. General anaesthetics and muscle relaxants
   - Inj. Thiopental
   - Inj. Tubocurarine
4. Non-steroidal anti-inflammatory agents
5. Blood products and vaccines
   - Red blood cell, white blood cell and platelet transfusions
   - Gamma globulin
   - Rabies
   - Tetanus
   - Diphtheria
   - Snake and spider antivenoms
6. Diagnostic agents
   - Iodinated radiocontrast agents
7. Venoms
   - Bees, wasps, spiders, jellyfish
8. Hormones
   - Inj. Insulin
   - Inj. Hydrocortisone
   - Pituitary extracts
   - Vasopressin
9. Extracts of allergens used for desensitization
10. Food
    - Eggs
    - Milk and milk products
    - Legumes(peanuts, soyabeans, kidney beans, chick peas)
    - Nuts
    - Shellfish
    - Citrus fruits
11. Other drugs
    - Protamine
    - Parenteral iron
    - ACE inhibitors
    - Inj. Dextran

Treatment

A severe anaphylactoid reaction is a life-threatening emergency. Effective treatment depends on prompt diagnosis and rapid supplementation of appropriate therapy.

1. Inj. Adrenaline 1:1000, 0.01 ml/kg (maximum 0.3 ml in children and 0.5 ml in adults) by IM injection. If necessary, dose can be repeated

every 15 minutes.

If the anaphylaxis is to injection of an allergen extract or to a hymenoptera sting into an extremity, half the dose of adrenaline can be infiltrated locally, subcutaneously after dilution with 2 ml saline.

A tourniquet above the site can also slow systemic distribution of allergen. It can be loosened every 3 minutes.

2. For severe anaphylaxis with shock as in all medical emergencies, initial management should be directed at the ABC of resuscitation, namely maintenance of adequate airway - suction, breathing, and circulation. If working alone, call for assistance.
3. Establish one or preferably two, wide bore intravenous lines. Commence rapid fluid resuscitation with normal saline.
4. If there is severe laryngeal obstruction, bronchospasm, circulatory shock or coma, intubate and commence intermittent positive pressure ventilation.
5. If there has been little or no response to the initial intramuscular dose of adrenaline, administer adrenaline 5 mcg/kg slowly in to the intravenous line. Repeat at 5 minutes intervals depending on response. If the patient remains in shock, start an adrenaline infusion (preferably via a central venous line), commencing 0.1 mcg/kg/min in children and 0.2 mcg/kg/min in adults, titration is required to restore blood pressure. Large doses of adrenaline may be needed.
6. If the only manifestation of anaphylaxis is urticaria or angioedema initial IM dose of adrenaline should be given in addition to H_1-antagonists. If no progression occurs, patient can be kept under observation for at least 12 hours and then discharged.

Additional measures

1. Administer Salbutamol or Terbutaline by aerosol or nebuliser.
2. Inj. Diphenhydramine 1 mg/kg slow intravenously.
3. Inj. Ranitidine 1 mg/kg slow intravenously.
4. Inj. Hydrocortisone 2-6 mg/kg or Dexamethasone 0.1-0.4 mg/kg IV.

Supportive treatment

Observe vital signs frequently and, if possible, monitor electrocardiogram and pulse oximetry.

All patients who have suffered a severe anaphylactoid reaction must be admitted to the hospital. Patients who remain clinically unstable after initial resuscitation should be admitted to an intensive care unit.

If patient is not admitted to hospital, and if they respond to the initial treatment, provide information to them about possible late reaction.

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Patient education

- To check and look for the cause (food, drugs etc.) and to avoid it in future.

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STRIDOR

Common causes of stridor in children are (i) congenital laryngomalacia, (ii) croup (acute laryngitis, laryngotracheobronchitis, epiglottitis); In adults, these are (i) croup, (ii) allergies and (iii) tumours. Sudden onset of stridor may be caused by aspiration of a foreign body. Other causes include peritonsillar, retropharyngeal abscesses, angioedema and hypocalcemic tetany.

Salient features

- Noisy respiration primarily during inspiration produced by turbulent airflow through narrowed air passages.
- Respiratory distress, restlessness and cyanosis are features of severe airway obstruction.

Treatment

Treatment of common causes of stridor is discussed below in three sections

A. Acute laryngitis/laryngotracheobronchitis.

B. Epiglottitis.

C. Diphtheria.

A. ACUTE LARYNGITIS LARYNGOTRACHEOBRONCHITIS (CROUP)

It is an acute infection of the larynx and is usually caused by viruses.

In children, may lead to respiratory obstruction.

Nonpharmacological

- Maintain airway by positioning the patient in lateral position with neck slightly extended.
- Gentle suction of secretions, if required.
- Taking out the child with spasmodic croup in fresh air may decrease the airway obstruction.

Pharmacological

Mild cases with minimal stridor (on exertion/crying) do not require any treatment and may need voice rest only.

Moderate (stridor at rest) and severe cases (to be hospitalized immediately) need specific therapy in the form of:

1. Inj. Dexamethasone 0.4 mg/kg IM stat and followed by
2. Inhaled Adrenaline 0.01 - 0.05 mg/kg/dose to be diluted in 3 ml saline every 1-2 hours. A few doses can be administered until side effects viz. tachycardia, tremors etc. appear.

   Or

   Inhaled Budesonide 500-1000 mcg/dose 12 hourly till response is seen.
3. Oxygen by ventimask/hood at the rate of 4-6 L/min.
4. Intravenous fluids maintenance dose (see section on fluids and electrolytes).

With the above supportive and specific therapy, need for endotracheal intubation/tracheostomy may arise rarely. In case, the patient is deteriorating steadily despite above therapy, elective intubation/ tracheostomy should be done to prevent respiratory failure.

B. EPIGLOTTITIS

It is usually caused by *H. influenzae* and is a potentially life-threatening condition. Lateral x-ray of soft tissue neck may show swollen epiglottis (thumb sign).

Treatment

1. As above in acute laryngitis.
2. Cap Amoxycillin 500 mg 3 times a day for 7 days.
   In Children 50 mg/kg/day in 3 divided doses.

   Or

   Tab. Roxithromycin 150 mg 2 times a day.
   In Children 5.8 mg/kg/day in 2 divided doses.

   Or

   Tab. Chloramphenicol 500 mg 6 hourly.
   In Children 100 mg/kg/day divided into 6 hourly doses.

Or

Inj. Cefotaxime 100 mg/kg/day divided into 3 doses.

C. DIPHTHERIA

It is usually seen in non-immunized children.

Salient features

- Presents as stridor but laryngeal examination may show a membrane like structure (pseudomembrane), removal of which leads to bleeding.
- Large cervical lymph nodes (Bullneck appearance) and hoarseness.
- Common complications are palatal palsy, III nerve palsy, polyneuritis and myocarditis.

Treatment

1. Supportive treatment as above in acute laryngitis.
2. Immediately refer the child to Infectious Diseases Hospital under supervision and oxygen therapy. In case the child cannot be transferred isolation should be done and following measures should be taken immediately:
3. Inj. Diphtheria antitoxin 20,000 - 40,000 IU, IV or IM for pharyngeal and laryngeal involvements with disease present for $\leq$ 48 hours; 40,000 to 60,000 IU for nasopharyngeal infections; 80,000 to 100,000 IU for diffuse involvement that has been present for $\geq$ 3 days.
4. Inj. Crystalline penicillin 1 Lac - 1.5 Lac units/kg/day divided into 4 doses for 14 days.

   Or

   Inj. Procaine penicillin 25,000 - 50,000 units/kg/day in 2 divided doses for 14 days.

   Or

   Syp. Erythromycin 40-50 mg/kg/day divided into 4 doses for 14 days.
5. IV saline infusion over 60 min.

Monitoring and followup

1. Watch the child for altered sensorium, degree of stridor, pulse rate, respiratory rate and for other features of respiratory distress like intercostal recession etc.
2. Laryngeal examination should not be done until facilities for intubation are available because it might lead to sudden respiratory arrest.

3. If child develops stridor at rest, hospitalize immediately.
4. Increasing respiratory distress with alteration of sensorium or cyanosis may be an indication for intubation.

Patient education

- Avoid overuse and misuse of voice.
- If stridor worsens or is noticed at rest, the patient should immediately report to the nearest health facility.
- Children with diphtheria should be completely immunized after recovery of the current episode and context to be immunized immediately.

References

1. Stridor. In: Scott Brown's Otolaryngology: 5th Edition, Volume 5,1987 pp. 420-427.

SEPTICAEMIA

Septicaemia is a clinical condition associated with invasion of blood stream by microorganisms giving rise to features of systemic inflammatory response syndrome (SIRS) i.e. presence of any two of the following: fever/ hypothermia, tachypnoea, tachycardia, leucocytosis/leucopenia. It may be associated with infection at specific sites (e.g. lungs, urinary tract, gastrointestinal tract) or there may be no clear originating focus. Septicaemia occurs more commonly in patients with defective body defences. In previously healthy persons, *Staphylococcus aureus, Streptococcus pneumoniae and Escherichia coli* are the most frequent organisms, while in patients with defective immune systems, Gram-negative bacteria including *Pseudomonas aeruginosa* may be responsible. Other febrile illnesses due to enteric fever and malaria may be difficult to differentiate from these pathogens clinically. Septicaemia when persists can result in multiorgan-dysfunction syndrome requiring immediate intervention to maintain hemostasis.

Salient features

Sick look, features of SIRS, symptoms of local site of infection of respiratory/gastrointestinal etc, and symptoms due to decreased perfusion of various organs e.g. confusion, disorientation, decreased urinary output, icterus, bleeding, diathesis (DIC) and haemodynamic instability like hypotension.

Treatment

Nonpharmacological

1. Care of airway and breathing as given in chapter on CPR.
2. Removal or drainage of a focal source of infection. Indwelling intravenous catheter, Foley's catheter etc should be replaced if considered as a source.
3. General care of skin, orodental hygiene and nutrition supplementation should be taken care of in prolonged severe sepsis.

Pharmacological

1. Oxygen therapy: 2-4 litres/min with catheter/mask (to keep SPO_2 >95%).
2. Intravenous fluids: to be guided by haemodynamic status. If in shock, aggressive fluid therapy as mentioned in chapter on Shock to maintain urinary output at more than 1 ml/kg/hour.
3. Dopamine and dobutamine are required if haemodynamic stability is not achieved by fluid therapy.
4. Antimicrobial agents: Antimicrobial therapy should be initiated as soon as samples for culture are withdrawn from blood and other relevent sites. Choice of antibiotics depends on suspected organism.

Immunocompetent host

1. Inj. Cefotaxime 150-200 mg/kg/day in 3 divided doses.

   Or

   Inj. Ceftriaxone 100 mg/kg/day (maximum dose 4 g/day) in 2 divided doses.
2. Inj. Gentamicin 7.5 mg/kg/day in 2-3 divided doses.

   Or

   Inj. Amikacin 15 mg/kg/day in 2-3 divided doses.
3. Add Penicillin/Vancomycin if *Streptococcis/Staphylococcis* organisms are suspected

   Inj. Penicillin G aqueous 200,000-300,000 units/kg IV 4 hourly.

   Or

   Inj. Vancomycin 15 mg/kg/day in 2 divided doses.

Immunocompromised host

1. Inj. Ceftizidime IV 150 mg/kg/day in 3 divided doses.
2. Inj. Vancomycin 15 mg/kg/day in 2 divided doses.

Follow up and monitoring

- Continuous monitoring of pulse, respiratory rate, blood pressure, capillary filling time, urinary output and neurological status should be done for early detection of septic shock or multiorgan failure.
- Patient should be referred to tertiary level centre if very sick or shows no signs of improvement after initial therapy.

Patient/parent education

- Immunocompromised patients should be informed about features of early sepsis. Fever in any child with congenital or acquired immunodeficiency state should be taken very seriously.

References

1. Sepsis and Septic Shock. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 799-804.
2. Sepsis and Shock. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th edition, 1999, pp 747-751.

COMA

Coma is defined as a prolonged period of unconsciousness and lack of reaction to stimulus. Patients in coma can't be aroused.

Salient features

- Structural damage to brain (haemorrhage, tumours, trauma, localized infections, meningitis, stroke).
- Metabolic disturbances (ischaemia, anoxia, uraemia, diabetes), respiratory/hepatic/renal failure, dyselectrolytaemia, endocrinopathies, drugs like opiates, barbiturates, benzodiazepines, anti-depressants and cyanide.
- Abnormal electrical activity - periodic lateralized epileptiform discharge (PLED).

  All these causes affect the functions of reticular - activating system and its connections with cerebrum.

Grading of Coma

GLASGOW COMA SCALE - Based on Eye opening, Best Motor Response, Best Verbal Response evaluation of a comatose patient includes history and physical examination of CNS (motor system, pupils, fundi, ocular movements and respiratory pattern) or any systemic metabolic disorder.

Treatment

Nonpharmacological

- Oxygen inhalation, intubation if needed, control of blood pressure and establish IV line and take history of patient.
- Drug screen, glucose, metabolic parameters, ABG, temperature.

Pharmacological

1. Inj. Glucose (25 or 50%) 50 g IV.
2. Inj. Thiamine 100 mg IV.
3. If opiate overdose is suspected, give Inj. Naloxone 0.8 mg IV. If response is inadequate, double the dose every 15 minutes (for details see section on opioid intoxication).
4. If benzodiazepine over dose is suspected, give Inj. Flumazenil 200 mcg IV slowly. If no response repeat 100-200 mcg after 1 minute. If required, give maximum dose of 1 mg or give as IV infusion of 100-400 mcg/h if drowsiness recurs.
5. If focal neurological deficit or signs of herniation/decerebration/ decortication occurs, CT scan, EEG and neurologic consultation is required.
6. If no clear aetiology and no herniation - CSF examination should be done.
7. If signs of raised intracranial tension (papilloedema, convulsions, decerebrate posture indicating herniation) occurs:
   a. Avoid giving free fluid (glucose solution) intravenously.
   b. Inj. Frusemide 40 mg IV to maintain adequate urine output of 30-50 ml/ h).
   c. Hyperventilate to bring down PCO_2 to 25 mmHg.
   d. Inj. Dexamethasone 20 mg IV stat and 6 mg 4 hourly.
   e. Inj. Mannitol 1.0 g/kg IV over 10 minutes.

Reference

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POISONING

General considerations

Increasing incidence of poisoning is attributable to rapid development of newer compounds in trade, industry and medicine and easy access to them. A stepwise care approach to a patient of poisoning is helpful in successful management.

Stepwise care approach

- Diagnosis - Suspect and identify poison, if possible.
- Treatment includes basic principles, antidotes, symptomatic and supportive.

- Anticipate complications, preserve evidence, and prevent sequelae as well as recurrence.

Diagnosis

1. Suspicion of poisoning should be aroused by sudden onset of symptoms, uniform and increasing severity of symptoms in a group e.g. food poisoning or industrial poisoning. Unexplained nausea, vomiting, diarrhoea, drowsiness or coma, euphoria, increased psychomotor activity, convulsions, delirium and unusual breath smell are symptoms which in the absence of disease need careful evaluation for suspected poisoning. Signs and symptoms helpful in diagnosis of poisoning are shown in Table 1.
2. Identification of the substance should not take precedence over the first step, since the process is slow and unreliable or lack of proper history might cause confusion. Action of poisons is modified by physical factors like quantity, form, chemical combination, dilution, route of administration and host factors like age, idiosyncrasy, sleep, food and use (abuse) of multiple substances.

Treatment

A. Basic principles and first aid measures.

- Attention to ABC of resuscitation is utmost priority at all times.
- Removal of poison from the person or person from the poison.
- In case of skin contamination with toxic materials, a shower or drenching the skin in a water tub and use of soap and water will mechanically remove the substance.
- For eye contamination, washing the eye with running clean water, holding the lids apart is a useful measure. Rubbing of eyes is to be discouraged. Use of sterile liquid paraffin will prevent irritation.
- When a toxic substance has been inhaled, removal of the person away to open surroundings, loosening of clothes and if necessary, artificial respiration are important first aid measures.

Table 1: ***Signs and symptoms helpful in diagnosis of poisoning.***

Signs	Poisons
1. CNS Signs	
Delirium/hallucinations:	Antihistamines, datura, atropine and related drugs, psychomimetics, bromides, salicylates, pesticides.
Depression/coma:	Barbiturates and other sedatives, hypnotics, tranquilizer, morphine group, organic solvents, carbon monoxide, cyanides.

Convulsions:	Organophosphates, organochlorines, phenol, amphetamine, atropine, kerosene, aminophylline, benzylbenzoate, salicylates, strychnine.
Weakness or paralysis:	Lead, arsenic, botulism, organic mercurials, triortho cresyl phosphate, pesticides.
Fasciculations:	Organophosphates
Dilated pupil:	Atropine group, cocaine, nicotine
Small pupil:	Opium group, phenothiazines, organophosphates
2. Respiratory Signs	
Respiratory difficulty:	Organophosphate-insecticides, salicylates, botulism, carbon monoxide, cyanides, atropine
Cyanosis without respiratory distress:	methaemoglobinemia
3. Temperature abnormality	
High fever:	Salicylates, anticholinergic, atropine, organophosphates, nitrophenols, kerosene, paracetamol.
Hypothermia:	Opiates, barbiturates
4. CVS Signs	
Hypotension:	Beta-blockers, sedatives, hypnotics or narcotic
Hypertension:	Amphetamine or sympathomimetic overdose, sedative or narcotic, tachycardia, withdrawal.
Bradycardia:	Digitalis, beta-blockers, calcium channel antagonists or hypothermia
5. Odours:	Kerosene, bitter almond- cyanides, garlic- parathion, organophosphates, phosphorus, alcohol, paraldehyde, phenols and cresols, sulfides.

In case of venomization by snake or other insect bites (see section on snake bite). Washing the area with clean water will mechanically remove the venom. Absorption of venom is prevented by a tight tourniquet round a single bone proximal to the bite, for a maximum of 30 minutes. Suction (oral) of the bite area should be discouraged.

If the patient is unconscious, put the patient in a position lying on one side (preferably left side) with head tilted slightly backwards so that

choking due to falling back of the tongue is prevented.

B. Removal of ingested poison

Procedures to prevent absorption of toxin from stomach and GI tract are emesis, gastric lavage and use of activated charcoal. Each has its limitations and risks. Risk of procedure should be considered before using the technique. Timing is an important limitation because most of the toxins are rapidly absorbed from the stomach. Liquid drug products are absorbed within 30 minutes and solids are absorbed in 1-2 hours.

1. Induce emesis

   (CAUTION: Contraindicated in cases of corrosive poisoning, unconscious patients and in those who have swallowed petroleum products.)

   Mechanical tickling of the throat with fingers, spatula or tongue depressor will induce vomiting.

   Or

   Two tablespoons of common salt or a tablespoonful of mustard powder in a glassful (200 ml) of water orally.

   Or

   Two to four teaspoonful (10-20 ml) of syrup ipecac followed by half a glass of water.

   (CAUTION: Contraindicated in children with age less than 6 months)

   Or

   Inj. Apomorphine hydrochloride 6 mg subcutaneously causes vomiting in 3-4 minutes but should be used with caution since it is also a depressant.

2. Following vomiting, dilute any poison left in the stomach by asking the patient to drink milk. Alternatively, one can use charcoal powder (activated). Charcoal should not be used in patients with poisoning due to an acid or alkali. It is prepared by dissolving 4 tablespoonful of powder in about 400 ml of water and half a glass is given to drink every 15 minutes. If charcoal is not available, powder of burnt bread can be used.

   And/Or

3. Gastric lavage - A lavage within one hour of ingestion of poison is useful in removing unabsorbed poison. It is carried out by using a stomach tube (working on siphon system) or a Ryle's tube, or soft rubber or plastic tube introduced into the stomach and washing out contents using water, saline, faint pink potassium permanganate solution (1 in 5000 to 10,000). Initial gastric aspirate in water should be preserved for medicolegal purposes to carry out chemical analysis. If the poison is known then an antidote solution can be left in the stomach after the lavage.

   Large amounts of fluid should not be used at the time of lavage as this

opens the pylorus and causes the substance to go into the duodenum. Before carrying out lavage, dentures must be removed and mouth gag used if the patient is non-cooperative.
(**CAUTION:** Lavage with stomach tube is contraindicated in corrosive poisonings, petroleum product ingestion, small children, unconscious patients without cuffed endotracheal tube in place and patients having convulsions. However, a careful use of Levin's tube is recommended by some in patients of corrosive poisoning seen within half an hour of ingestion).

4. Purging - Purging is carried out using sodium sulphate, magnesium sulphate, mineral oil (for glutethimide), castor oil (for phenol poisoning). (**CAUTION:** Castor oil is contraindicated in chlorinated insecticides since it enhances their absorption.)

Elimination through other measures

Elimination of poisonous substances can be enhanced by use of diuretics like frusemide, ethacrynic acid, acetazolamide, and osmotic substances like urea and mannitol. Forced alkaline diuresis treatment is done in patients of barbiturate intoxication.

Other effective measures to eliminate ionizable substances are peritoneal dialysis, haemodialysis and exchange transfusions.

C. Antidotes

The absorption of the ingested poison can be reduced by activated charcoal, cholestyramine, Fuller's earth, bentonite etc.

Activated charcoal 5-10 times the amount of ingested poison, either by mouth or by gastric tube in conjunction with or after completion of lavage should be administered. It is particularly useful in poisoning with alcohol, barbiturates, iron, phenothiazines, salicylates, tricyclic antidepressants and many plant toxins. It should be administered within 1-3 hours after ingestion of poison but it is not a substitute for adequate gastric lavage.

Sorbitol or a saline cathartic should accompany charcoal administration in order to enhance gut motility and to possible increased toxin elimination. Commonly available specific antidotes are shown in Table 2.

Table 2. ***Commonly available specific antidotes.***

Poison	Antidote and dose
Carbon monoxide	- Pure oxygen
Cyanide	Sodium nitrite 3% soln, 0.2 ml/kg, IV over 2 min followed by sodium thiosulphate (25% soln, 1 ml/kg, IV over 10-20 minutes)

Nitrate and nitrites	-	If methaemoglobinaemia, treat with methylene blue
Organophosphates	-	Inj. Atropine - 0.05 mg/kg, IV every 10 min until signs of atropinism
	-	Inj. PAM 25-50 mg/kg, IV in older children, and 250 mg IV in infants over 5-10 minutes, 8 hourly upto 36 hours.
Anticholinergics	-	Inj. Physostigmine 0.56 mg slow IV over 5 min (atropine gp); repeated every 10 min till a maximum of 2 mg.
Narcotics (opium morphine)	-	Inj. Naloxone - 0.1 mg/kg, IV or intratracheal, from birth upto 5 years or 20 kg of weight, at time a minimum of 2 mg should be used.
Methyl alcohol	-	Ethyl alcohol
Phenothiazine	-	Diphenhydramine 1-2 mg/kg or promethazine
Iron	-	Desferrioxamine 15 mg/kg/h IV in 100-200 ml 5% glucose soln (maximum 360 mg/kg, upto a total of 6 g)
Paracetamol	-	N-acetylcysteine: Oral - initially 140 mg/kg, then 4 hourly upto 72 hours. IV 150 mg/kg by infusion over 125 min followed by 50 mg/kg 4 hourly for 72 hours.

D. Give symptomatic therapy for pain, vomiting, diarrhoea, abdominal distension, convulsions, hyperexcitability and delusions (for details see appropriate section).

E. Supportive treatment

Fluid and electrolyte disturbances are managed with proper laboratory investigations and assessment of intake and output. Careful monitoring of vital signs like temperature, pulse, respiration and blood pressure is mandatory. Metabolic needs are increased by about 10% with rise in temperature by 0.8°C. Hypothermia delays detoxification and excretion of poison due to reduced metabolism and circulatory disturbances.

A comatose patient needs careful supervision for clear airway, proper oxygenation, prevention of aspiration of gastric contents by proper positioning, frequent change of position, care of bladder, bowels, skin, eyes and buccal mucosa. Antibiotics for infections are given according to the needs.

F. Other aspects

1. Complications of various types arise commonly in poisonings. Anticipating such complications and proper management helps in successful outcome.

Complications	Poisons	Management
Pulmonary oedema	CNS depressants Organophosphorus compounds Poisonous bites	Semirecumbent position Diuretics Mannitol Corticosteroids
Cardiac failure	Electrolyte disturbances Toxic myocarditis Scorpion bites	Cardiac glycosides
Cerebral oedema	Convulsions Methyl alcohol	Diuretics Mannitol Dexamethasone
Acute renal failure	Nephrotoxic drugs Venoms Hypovolemic shock Haemolytic reactions	Management of shock Alkaline urine Fluid & electrolyte balance maintenance, Dialysis
Acute hepatic failure	Poisonous substances Snake bites	Management of liver failure

2. Preserving evidence for medicolegal purposes and toxicological studies is the responsibility of the attending physician. Urine, stool, gastric contents (vomited or aspirated), blood and food samples and viscera should be preserved.
3. Prevention of sequelae like strictures following corrosive poisoning is done by using corticosteroids. Corticosteroids are useful in petroleum product poisoning to treat shock lung syndrome and to prevent pulmonary fibrosis.
4. Preventing recurrence of poisoning is by proper labeling, keeping such substances away from children, keeping medicines, cosmetics and household products separately, and psychiatric attention to patients who have taken drugs with suicidal intention.

ORGANOPHOSPHORUS POISONING (OP)

Common agents for organophosphorus poisoning are malathion, parathion (fatal dose 0.1 mg/kg). Onset of symptoms is within 12 hours of exposure; usually following a household spraying.

Salient features

- Dizziness, headache, blurred vision, miosis, excessive lacrimation and salivation, nausea, vomiting, diarrhoea, epigastric pain, sense of constriction around chest, dyspnoea, sweating, muscle twitching and fasciculations, convulsions, flaccidity and

muscle weakness, loss of reflexes and coma. Fasciculations are less common in children than in adults. Bradycardia may occur in some paediatric patients.

- A high index of suspicion is needed as the history of exposure may be denied. It may be confirmed by measuring red cell cholinesterase level, which is reduced to 20% of the normal values in clinically apparent poisoning (normal range 0.6-0.9 pH) IH.

Treatment

Bradin and Van Eeden have suggested a clinical grading of the patient's presenting signs within a few hours, which may help in planning the management and predicting the prognosis. Mild poisoning (normal consciousness, mild secretions and few fasciculations) suggests eventless recovery. Severe poisoning (copious secretions, generalised fasciculations, and altered consciousness) indicates the likelihood of complications and the need for ventilation. Life threatening poisoning, generally associated with suicide attempts is characterized by a $pO_2 < 75$ mmHg and abnormal chest x-ray. These patients need immediate ventilatory support.

1. Establish airway, suctioning, and oxygen. This is most urgent as death can occur from respiratory failure. Establish an IV line, monitor BP, do not rush fluids.
2. Decontamination of the skin, mucous membrane and gut (if skin is contaminated, clean with soap water and change the clothings; gastric lavage and catharsis if poison has been ingested).
3. Inj. Atropine IV 0.05 mg/kg every 10 minutes until signs of atropinism appear; maintain it for 24 hours. The signs of atropinism are: drying of all secretions (most reliable) delirium, restlessness, fever, tachycardia, dryness of tongue and dilated pupils. As much as 10 times of usual dose of atropine may be required. (CAUTION: There is no fixed dose of atropine in OP poisoning. The aim is to keep patient atropinised till poison effect weans off).
4. In severe cases, immediately give Inj. Pralidoxime (PAM) 25-50 mg/kg IV in older children and 250 mg IV in infants over 5-10 minutes, 8 hourly up to 36 hours.
5. Assisted ventilation may be required in upto 25% of patients.

HYDROCARBONS (KEROSENE, PETROL)

This is the most common accidental poisoning in children, usually in infants and toddlers. Significant toxicity does arise from the inhalation of vapours or pulmonary aspiration of the liquid. Large amounts (100 ml or more) must be swallowed to allow GI absorption to produce pulmonary lesion.

Salient features

- Two major system affected by hydrocarbon ingestion are the respiratory and central nervous system.
- Respiratory symptoms are usually due to chemical pneumonitis or bronchopneumonia (cough, breathlessness, tachypnoea and fever) and may appear as early as within 15 minutes and as late as 24 hours after kerosene ingestion. Hyperexpansion of chest is seen occasionally. In severe cases haemoptysis ensues. Cyanosis is accentuated and death may follow, usually within 24 hours.
- CNS involvement can cause lethargy, dizziness, headache, visual disturbances and may progress to seizures, hyperpyrexia, coma, respiratory paralysis and death. Symptoms usually subside between the second and fifth day.
- Radiographic findings consist of perihilar mottling, consolidation, areas of collapse or frank pulmonary oedema. Pleural effusion may develop. Rarely cysts or pneumatoceles may form. The x-ray abnormality usually clears within 7-10 days but may rarely last for months.

Treatment

Record vital signs and observe for 6-8 hours. If the patient is asymptomatic it is unlikely that significant problems will occur. If significant symptoms appears, the patient should have a chest x-ray. It may identify pulmonary disease not appreciated by auscultation in upto 60% cases. Liver and renal functions tests, urine analysis and electrolytes should be evaluated.

1. Prevention of aspiration is the main goal. Do not induce emesis.
2. Lavage with a cuffed endotracheal tube in situ has been advocated in comatose patients. If large amount (1-2 ml/kg) is ingested, controlled gastric emptying must be done in an alert patient by a stomach tube.
3. Instillation of oils to slow gastric emptying and decrease intestinal absorption has not proved to have practical application.
4. Specific treatment is aimed at aggressive correction of hypoxia with humidified oxygen and CPAP (continuous positive airway pressure).
5. Prophylactic antibiotics to prevent secondary bacterial infection may be used.
6. Proper supportive care especially to maintain fluid balance and to prevent hypoxia.

Value of corticosteroids to prevent chemical pneumonia is doubtful.
Pneumatocele, pneumothorax, cardiomegaly or arrhythmia may occur

occasionally. Recovery is usually complete. However, pulmonary fibrosis and bronchiectasis have been known on long term follow up.

DATURA POISONING

Datura stramonium (thorn apple) grows in India at high altitudes. The seeds and fruits are the most poisonous parts of the plant with hyoscine, hyoscyamine and traces of atropine, as the active principles. The dried leaves and dried seeds are used in India, as a substitute for stramonium and belladonna. The drug is commonly used in India for criminal purposes.

Salient features

- Peripheral effects are predominant and result from anticholinergic (parasympatholytic) action. Central effects involve initial stimulation of the CNS, with excitement and restlessness followed by subsequent depression, delirium and coma.
- Within half an hour of taking the poison, gastric irritation starts. The patient complains of a bitter taste, dry mouth and throat, burning pain in the stomach and difficulty in swallowing and talking. This is followed by giddiness, ataxia, incoordination of muscles, a peculiar flushed appearance of the face, dry hot skin, rise in temperature, diplopia, dilated pupils with loss of accommodation, reddening of the conjunctiva and drowsiness. Sometimes, an erythematous rash appears all over the body.
- Usually a full, bounding pulse which later becomes weak and irregular.
- Muttering delirium, tries to run away from the bed, picks at bed clothes, tries to pull imaginary threads from the tips of his fingers and develops dreadful hallucinations of sight and hearing. The condition may pass on to stupor, convulsions, coma and sometimes death from respiratory failure.
- Death may occur within 4-24 hours.

Treatment

1. The stomach is washed out with 1:10,000 potassium permanganate solution or 5 per cent tannic acid solution.
2. In severe poisoning only Inj. Physostigmine 1-2 mg IM or IV repeated after half an hour, if necessary. Watch for side effects (bradycardia, heart block, excessive secretions).

Or

Inj. Pilocarpine nitrate 6-15 mg injected subcutaneously.

3. Inj. Diazepam may be given for convulsions (see section on status epilepticus)
4. For delirium, chloral hydrate, Inj. Paraldehyde or any short acting barbiturate is usually given.
   (CAUTION: Morphine is contraindicated).

OPIOID INTOXICATION

Opioid overdose can be a medical emergency and is usually accidental. It can result from incorrect estimation of dose or erratic pattern of use in which person has lost previous tolerance to drug. Often caused by combined use with other CNS depressants e.g. alcohol or sedative-hypnotics.

Salient features

Pinpoint pupils, respiratory depression and CNS depression, decreased gastrointestinal motility, analgesia, nausea and vomiting, slurred speech, hypotension, bradycardia and seizures.

Treatment [Immediate admission in Intensive Care Unit (ICU)].

1. Establish adequate airway and respiration. Oxygen inhalation and IV fluids. If facilities are available, give artificial ventilation
2. If ingested, gastric lavage can be given with 1:10,000 potassium permanganate solution.
3. Inj. Naloxone 0.8 mg IV (0.01 mg/kg for neonates) and wait for 15 minutes.
   If the patient shows no response, give another dose of 1.6 mg IV and wait for 15 minutes. If the patient still shows no response, give 3.2 mg IV and suspect another diagnosis. If successful, continue at 0.4 mg every hour IV until the opioid has been cleared (up to 3 days for methadone).
   Babies born to opioid-abusing mothers may experience intoxication, overdose or withdrawal.
4. Always consider possible polysubstance overdose. A patient successfully treated with naloxone may wake up briefly only to succumb to a subsequent overdose from another slower acting drugs e.g. sedative-hypnotic taken simultaneously.
5. Supportive measures for hypotension.
6. Body warmth to be maintained with hot water bottles.
7. If convulsions are present Inj. Diazepam 10 mg IV and repeated as

required (for details see section on status epilepticus).

8. The patient should not be made to walk forcibly in opium poisoning, as it is frequently done, but attempts should be made to keep him aware, by flicking a wet towel on the face.

HEAD INJURY

Head injuries are frequent form of injuries in cities. A systematic approach is required to differentiate trivial injury from severe forms which may be life threatening or may lead to neurological sequalae.

Treatment

- Symptoms and signs of severe forms may appear immediately as in concussions or contusions or may appear after a few minutes to hours as in acute subdural hematoma. It is mandatory that a patient should be observed for at least 24 hours for appearance of symptoms and signs of serious intracranial problem even if trauma appears trivial.
- Patient with history of unconsciousness, bleeding from nose/ear, seizures or presence of black eye, suspected fracture of skull and hematoma of scalp indicate severe form of head injury and require hospitalization.

Minor Injury

A patient who is alert and has only one or more symptoms of headache, faintness, nausea, a single vomiting, difficulty with concentration or slight blurring of vision should be kept under observation for a few hours and then sent home with proper instructions to the family members.

Decision for X-ray skull and CT scan depends or degree of trauma to the rest of body and skull, in addition, to the worsening of symptoms and signs.

Severe Head Injury

Patients with persistent confusion, behavioral change, coma, focal neurological signs and features of raised intracranial pressure require immediate attention and should be admitted to the hospital. A CT scan should be done in all such cases and treated as follows:

1. Check and maintain air way and breathing (see section on CPR)
2. Check circulation by pulse volume, rate, blood pressure
3. Establish IV access
4. IV fluids according to volume loss (see section on shock)
5. Check for and stabilize extra cranial injuries
6. If spinal injuries are excluded then transfer the patient in side position

with head down, to a tertiary care center where neurosurgical interventions are available.

7. If spinal injury is suspected then transfer the patient on a hard board, place two sand bags on either side of the head
8. Assessment by Glasgow coma scale as given in a section on coma may be used to prognosticate or follow a patient of head injury for improvement/deterioration of neurological status. Patients with Glasgow coma scale score 8 or less or with deterioration of level of consciousness should be transferred to a center where facilities for neurosurgical interventions are available. Over 85% of patients with aggregate score of 3 or 4 die within 24 hours while score of 11 or more indicates death in only 5- 10%
9. A subdural hematoma, epidural hematoma or large intracerebral hematoma may require surgical intervention and must immediately be attended to by a neurosurgeon.
10. Hyperthermia, hypoxia and hypercarbia exacerbate intracranial pressure, so does an awkward head position like acute flexion. These conditions must be appropriately treated, if necessary by mechanical ventilation.
11. Increased intra cranial pressure can be treated with Inj. Mannitol (20%) 0.25 g - 1 g every 3 to 4 hours.

Patient education

- If a patient has been sent home considering the initial diagnosis of minor head injury, the family members must be advised to report back in case of persistent/increasing headache, vomiting, deterioration of level of consciousness or appearance of any focal motor weakness.
- A guarded prognosis in severe head injury is given but some children and young adults show remarkable recoveries despite low score on Glasgow coma scale.

References

1. Traumatic injuries of Head and Spine. In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Kasper DL et al (eds), 15th Edition, Mc Graw Hill Company Inc. New York, pp 2434 – 2442.

THORACIC TRAUMA

Thoracic trauma is responsible for one-fourth of civilian trauma deaths. Two third of these death occur after reaching the hospital. Deaths can be prevented by prompt transportation, diagnosis and correct management.

Most thoracic trauma do not require thoracotomy but rather simple life saving manoeuvers of airway control, rapid infusion of fluids and tube thoracostomy are needed. The trauma can be penetrating or blunt.

Blunt trauma causes injury to the chest by the following mechanisms:

1) Direct blow e.g., rib fracture.
2) Deceleration injury e.g., pulmonary contusion.
3) Compression injury e.g., cardiac and diaphragm injury.

Salient features

- Chest pain and shortness of breath. Careful physical examination of the patient is important especially in the management of patient with equivocal radiological investigation.

Management

a) Resuscitation. Assess for the patency of airway, breathing and circulation. Ensure the patency of the airway and adequacy of ventilation. Insert two 16G intravenous cannulae and start resuscitation with crystalloid. If haemothorax or a pneumothorax are suspected in a patient with acute respiratory distress, chest tube should be inserted through the $4^{th}/5^{th}$ intercostal space in the anterior axillary line on the affected side without waiting for chest radiography.

b) Quick assessment of injuries

Treatment of specific injury

1. Chest wall

a. Rib fracture can vary from simple fracture to fracture with haemopneumothorax, to severe multiple fractures with flail chest and internal injuries. In case of simple fractures, pain with inspiration and localized tenderness and occasional localized crepitus on examination are present. Diagnosis is confirmed with a chest x-ray anteroposterior view. Exclude other intrathoracic injuries. Patients are treated with adequate analgesic drugs and muscle relaxants.

In cases of multiple fractures, intercostal nerve blocks or epidural analgesia is required to ensure adequate pain relief and ventilation. Elderly patients need admission for pain relief, ventilation assistance and observation.

b. Flail chest occurs due to unilateral fracture of 4 or more ribs, both anteriorly and posteriorly, or bilateral anterior or costochondral fracture of more than 4 ribs causes a paradoxical respiratory motion. It leads to hypoventilation, atelectasis, hypercapnia and inadequate ventilation (RR>40/min, pO_2< 60 mmHg with 60% FiO_2). It requires immediate endotracheal intubation and ventilatory support.

2. Pleural space

a. Haemothorax should be suspected with penetrating or severe blunt thoracic injury. It is classified according to the amount of blood collected inside the pleural cavity and more importantly rate of bleeding after evacuation. In 85% of the patients with haemothorax, only tube thoracostomy is required. After tube thoracostomy, if the rate of continuing haemorrhage is more than 100-200 ml/hour or the haemorrhagic output exceeds 1000 ml in 24 hours, thoracotomy should be performed.

b. Pneumothorax is a true surgical emergency requiring immediate diagnosis and chest tube insertion. Subcutaneous emphysema, absent breath sound, mediastinal shift and acute respiratory distress warrant immediate chest tube insertion without waiting for a chest X-ray examination. Sucking chest wounds which allow air to pass in and out of the pleural cavity should promptly be treated by closure of the wound (initially sealing with large pads and later with suturing) and concomitant tube thoracostomy.

Simple pneumothorax (without tension) should also be managed by chest tube insertion but only after documentation by chest X-ray.

3. Lung injury

a. Pulmonary parenchymal injury can be effectively managed nonoperatively, but about 15% of penetrating lung injury requires thoracotomy for control of haemorrhage. Approximately 80-90% of pulmonary injuries requiring operation can be managed by simple suturing or stapling of the involved segments. Only 10-20% require anatomical lung resection.

b. Pulmonary contusion in most patients with flail chest can also appear without any evidence of rib fracture (particularly in children). Treatment is often delayed because clinical and X-ray findings may not appear until 12-24 hours after injury.

Clinical findings are loose, copious, blood tinged secretions, chest pain, restlessness, and laboured respiration. X-ray changes consist of patchy parenchymal opacification or diffuse peribronchial densities. Management involves careful pulmonary support and clearing of secretions, with ventilatory support if arterial blood gases cannot be maintained in a physiologic range. PEEP is a useful adjunct in the management of those requiring ventilation. Fluid overload should be avoided.

4. Trachea and bronchus

Tracheobronchial injuries should be suspected when there is a massive air leak or when the lung does not readily expand after chest tube placement. In most patients having pneumothorax, subcutaneous

emphysema, pneumomediastinum, and haemoptysis, diagnosis may require tracheobronchoscopy. When diagnosis is confirmed, thoracotomy and primary repair is advised.

5. **Heart and pericardium**
   Cardiac tamponade can occur both from blunt and penetrating cardiac trauma. Tamponade in blunt trauma is often due to myocardial rupture or coronary artery laceration. Patient presents with chest pain, distended neck veins, shock and cyanosis. Treatment includes immediate thoracotomy, pericardial decompression and repair of injuries.
6. **Oesophagus**
   Anatomically, the oesophagus is well protected, and perforation from external wounds is relatively infrequent. The most common symptom of esophageal perforation is pain; fever develops within hours in most patients. Regurgitation of blood, hoarseness, dysphagia or respiratory distress may be present. Physical findings includes shock, local tenderness, subcutaneous emphysema, or Hamman's sign. X-ray findings on plain chest films include evidence of foreign body or missile and mediastinal widening or air. Contrast studies (urograffin not barium) confirm the diagnosis.Treatment consists of early recognition (24-48 h), closure of esophageal perforation and pleural drainage. Old perforation may require advanced surgical management and should be referred to a specialized center.

References

1. Thoracic Injury and Sepsis. In: Hamilton Bailey's Emergency Surgery. Ellis BW, Paterson-Brown S. Arnold (eds), 13th Edition, 2000, London, pp 285-288.

BLUNT ABDOMINAL TRAUMA

The presentation varies from inoccuous injury with no symptoms or signs of a severe injury presenting with peritonitis or shock or even causing death before reaching the hospital. The management depends upon the condition at presentation:

1. Immediately transfer the patient to the hospital along with intensive monitoring, where facilities for operation are available after providing first-aid treatment for bleeding and shock. Evaluate for head injury and intrathoracic injuries.
2. Immediate exploratory laparotomy should be done, if the patient is in shock, has rigid distended abdomen, evidence of peritonitis or evisceration of the bowel:
3. **a) Diagnostic peritoneal lavage (DPL)** in patients with trauma who are hypotensive with possible intra-abdominal bleeding but physical

examination findings are not reliable due to altered sensorium (injury to brain, ingestion of alcohol or drugs), loss of sensation (injury to spinal cord) or injuries to adjacent structures (pelvis, ribs, dorsolumbar spine):

- Insert nasogastric tube and urinary catheter.
- Use an infraumbilical incision (supraumbilical if patient has pelvic fracture).
- Lavage is considered positive, if you get 10-20 ml non-clotting blood or bile, succus entericus, stool or food material.

In a hypotensive patient with grossly negative 'tap' (i.e. no fresh blood aspirated), the value of time-consuming lavage with 1000 ml of saline and its evaluation by microscopy (often not available) is questionable.

b) **Contrast Enhanced Computer Tomography (CECT)** of abdomen should be performed in patients who are haemodynamically stable and in whom physical examination is unreliable because of the above mentioned factors. If CECT detects diaphragmatic injuries, intraperitoneal or retroperitoneal free air, contrast extravasation from bowel, disruption of pancreas, urinary bladder injury or grade IV or V injuries of liver, spleen and kidney with hot spot (active haemorrhage), exploratory laparotomy should be performed.

Patients with lesser grades of liver or splenic injuries can be managed conservatively, provided intensive monitoring facilities and facility for immediate exploration, should the need arise, is there.

It must be reiterated that during conservative management, these patients need intensive monitoring and frequent reviews by an experienced surgeon. If these are not available or there is doubt about the nature of injuries, exploration is safer.

When CT scan is not available, chest x-ray in erect posture, plain x-ray films of abdomen and contrast studies of the bowel or urinary tract as and when indicated will detect all the injuries except injuries to liver, spleen and pancreas. Ultrasound examination can help to detect solid organ injuries, collections in the peripheral cavity etc.

Imprint abrasions or patterns of injury are the marks of ecchymosis due to restraint devices like seat belts. When present, they often are signs of serious intra-abdominal injuries especially to hollow viscous or to lumbar spine.

References

1. Maingot's Abdominal Operations, Zinner MJ, Schwartz SI, Ellis H. (eds), 10th Edition, 1987, Prenttice Hall International, pp 763-786.
2. Abdominal trauma. In: Hamilton Bailey's Emergency Surgery. Ellis BW, Paterson-Brown S. Arnold (eds), 13th Edition, 2000, London.

PENETRATING STAB INJURIES

The management depends upon the site of injury.

I. Anterior abdominal wall (between two axillary lines)

A. Immediate exploratory laparotomy if patient is in shock at the time of presentation with rigid distended abdomen, peritonitis or evisceration.

B. Wound exploration in operation theatre with good illumination in haemodynamically stable and cooperative patients. If anterior fascia (in obese patients) or peritoneum (in thin patients) is not breached, wound can be closed after irrigation and patient can be discharged and followed up in the OPD.

C. If wound exploration reveals breach of anterior fascia or peritoneum but the abdomen does not have evidence of peritonitis, the patient can be admitted and serially examined for 24 hours. This method can delay definitive operation in about 5-10% of patients. The other option is to perform diagnostic peritoneal lavage (DPL). DPL in stab injuries has slightly higher false positive results (as compared to blunt abdominal trauma) because of bleeding from the site of stab wound. It can also miss some hollow viscous injuries especially of colon if patient presents early and hence DPL is performed very early.

D. In the sub-group of patients in whom there is high suspicion of intra-abdominal injury, but the patient is haemodynamically stable on presentation, perform diagnostic laparoscopy. It can confirm or rule out intra-abdominal injury without needing a laparotomy. However, it must be performed by a surgeon experienced in laparoscopy.

II. Stab wound of the flank (between anterior and posterior axillary lines from sixth intercostal space to iliac crest) and back (posterior to posterior axillary line between tip of scapula and iliac crest).

In haemodynamically stable and cooperative patients

Wound exploration in operation theatre with good illumination. If anterior fascia (in obese patients) or peritoneum (in thin patients) is not breached, wound can be closed after irrigation and patient can be discharged.

In patient where the end of the wound track can't be reached (because of thick musculature in that area), patient should be admitted and serially examined for 24-48 h. If any signs of intra-abdominal injury are obvious, laparotomy should be performed. This method can delay definitive operation in about 5-10% of patients.

The other option in these patients is to perform triple contrast CECT (intravenous, oral and rectal), and proceed according to the findings. This has an overall accuracy of 96-97%.

III. Gun shot wounds of the abdomen

Most of the patients of gun shot wounds of the abdomen need immediate exploratory laparotomy since visceral or vascular injuries that need surgical repair are seen in more than 95% of these patients. However, if patient presents late and is haemodynamically stable and have no signs of peritonitis, the patient can be serially examined or subjected to triple contrast CECT before deciding for conservative treatment.

References

1. Abdominal Trauma and Indications for Celiotomy. In: Trauma. Moore EE, Mattox KL, Feliciano DV, Appleton & Lange (eds), 2nd Edition, 1991, pp 409-426.
2. Blunt & Penetrating Abdominal Trauma. In: Maingot's Abdominal Operations, 10th Edn. Prentice Hall International, 1987, pp 763-786.

CHEMICAL BURNS OR INJURIES OF THE EYE

Chemical injuries due to entry of alkaline or acidic materials may result in potentially serious ocular damage including permanent visual loss and cosmetically unsightly eye. Alkalies cause extensive damage due to their ability to readily penetrate inside the eye. Most acid burns cause mild ocular damage because they tend to coagulate and precipitate proteins which act as barrier for further penetration of acids. Depending upon the concentration and degree of penetration, may be injury to the conjunctiva, cornea, limbal stem cells, episclera, sclera, uvea, lens and eye lid etc.

Salient features

- Clinical manifestations vary according to the extent of ocular surface injury: congestion and chemosis of conjunctiva, corneal epithelial damage, total loss of corneal epithelium, corneal hazziness or totally opaque cornea, limbal ischaemia, anterior uveitis, cataract and rise in intraocular pressure (IOP), lid injury, symblepharon.
- Complications include non-healing epithelial and stromal ulceration, corneal perforation, corneal melting, sequelae vascularized opaque cornea: cataract, glaucoma, symblepharon, dry eye, eye lid deformities, phthisis bulbi.

Treatment (At the site of injury)

Irrigate the eye (conjunctival sac) with any innocuous liquid water. The

face may be plunged into a water container and then open the eyes under water.

Treatment in the hospital

1. Irrigation in the hospital - retract the eye lids and irrigate the conjunctival sac with normal saline or ringer lactate or water using intravenous tubing connected to the irrigating solution for 30 minutes or until litmus paper touched to the inferior fornix indicates neutrality.
   (**CAUTION:** Do not try to neutralize the alkali with acids or vice versa)
2. Remove retained solid particles of lime, lye or any other material from superior and inferior fornix after anaesthetizing the conjunctiva. It may require double eversion of eye lid and use of forceps. If double eversion is not possible, a moistened cotton-tipped applicator should be swept in the fornix.
3. Sodium ethylene diamine tetra acetic acid (EDTA) 0.01 to 0.05 molar solution may be used as an irritant to dissolve calcium hydroxide.

Pharmacological (acute phase 1st week)

1. Homatropine eye drops 2% 3 times a day.
2. Gentamicin eye drops 0.4% 4 times a day.

   Or

   Ciprofloxacin eye drops 0.3% 4 times a day.
3. Tab. Ibuprofen 400 mg if required.

Patch the eye and refer to an ophthalmologist.

Surgical therapy

Debridement, tenoplasty, limbal stem cell transplantation, keratoplasty, keratopresthesis etc.

References

1. Manual of Ocular Diagnosis and Therapy, 4th Edition, 1996, Little Bran and Company, pp 32-33.

FOREIGN BODY IN THE EYE

This could be a small insect or a piece of grit or a loose eyelash.

Salient features

- Acute pain, redness and watering in the affected eye.

Treatment (at the site of injury)

Nonpharmacological

Not to rub the affected eye if possible, make the patient blink the eyelids, with the eye under clean water. If this is not effective, make the patient

sit in good light, wash your hands with soap and water and try to remove the foreign body gently by flushing the eye with clean water or saline.
For foreign body under the upper eyelid, turn the eyelid up and identify the foreign body and then remove it gently with moistened and twisted cotton wool or a clean piece of cloth.
In case the foreign body is in the lower lid, gently draw the lower lid down and identify the particle and remove it with a moistened wisp of cotton. (If the foreign body cannot be easily picked away or is embedded, do not try to remove it and cover the eye with a light bandage and refer the patient to a doctor.) After removal, Tetracycline eye ointment/eye drop should be applied and the eye should be bandaged.
In case the foreign body cannot be removed or corneal perforation occur immediately refer to a higher centre.

FRACTURES

A fracture is a break in the structural continuity of a bone. It is termed as an open (or compound) fracture, if there is a concomitant wound through which the fracture site communicates to the environment. If the fracture does not communicate to the environment, it is called as close fracture.

Salient features

- Pain, swelling, tenderness, loss of function, deformity, shortening, crepitus, abnormal mobility and loss of transmitted movement, singularly or in combination.

Treatment

Only observe but do not elicit these signs by purposefully manipulating the limb at the site of accident or injury.

Emergency care of fractures at the site of accident (First aid)

- Give temporary immobilization (called splintage) after grossly correcting the deformation without moving or manipulating much. With either wooden stick/an umbrella/a folded magazine or newspaper. A fractured lower limb temporarily can be supported and tied with opposite lower limb for splintage and transfer of patient; a fractured upper limb can be splinted by supporting it on the chest wall and wrapping any cloth piece around it. Take a note of the colour of the finger or toes before applying splintage.
- If the patient has an open fracture with excessive bleeding, attempt stopping bleeding by applying compressive dressing over the wound.

- If injury to the spine is suspected, carefully move the person from the site of accident in one piece like a log of wood without any twisting or flexion.

The care of patient in the emergency department

a) **Patient with fracture in an extremity:** Splint the limb with either Crammer wire (a malleable metallic support) or a slab or goose splint (thin layers of wood adhered to cloth) or a Thomas Splint (for femoral fractures) or Bohler Braun splint (for fractures around the knee or leg bones fractures), include the proximal and the distal joint of the fractured segment of the limb (Table 1).

Table 1. ***Splinting in injured/fractured part of the limb***

Injured/Fractured part of limb	Extent of Splintage
Fingers	Support with adjacent finger (called Buddy's Strapping)
Hand	Terminal pulp of fingers to proximal third of forearm.
Wrist	Distal palmar crease to upper one third forearm.
Elbow and forearm	Distal palmer crease to upper one third of arm
Arm	Middle one third of forearm to base of neck (include shoulder)
Foot and ankle	Base of toes to upper one third leg.
Leg	Base of toes to upper one third thigh (include knee and ankle). Can apply Bohler Braun splint also.
Knee	Just above the malleoli to upper one third of thigh
Thigh	Base of toes to nipple line on trunk. The better option is application of Thomas Splint (See later)

Any open wound is dressed before application of splintage. For wounds of open fractures, irrigation of the wound with copious amount of saline (0.9% NaCl) helps removing dirt and foreign particles/bodies.

The definitive treatment should be provided by an orthopaedic surgeon after radiological examination.

b) Multiple Injuries: Remove clothing and examine the patient rapidly from head to toe.

- Ensure patency of the airway.
- Perform throat suction, if secretions are present in the throat.
- The neck may be "gently" turned to one side to prevent aspiration and ensure patent airway and breathing.
- Check for pneumothorax or a flail segment and take appropriate measures.
- Record vital parameters. Assess the level of consciousness according to the Glasgow Coma Scale. Establish intravenous line and catheterise the patient.
- Splint the limbs and note down distal neurovascular status. The patient,

if required to be shifted, is handled with great care as he might be having spinal injury.

Pharmacological

1. Inj. Diclofenac sodium 75 mg IM stat for pain relief.
   (**CAUTION:** Do not give any sedative or centrally acting analgesic (like morphine or its derivatives) to keep a watch on their level of consciousness and early detection of any complication arising secondary to any fracture in the limb).
2. Inj. Tetanus toxoid 0.5 ml IM stat if open injuries or wounds
3. IV fluids for management of haemorhagic shock (see section on shock) – give an initial rapid fluid bolus of 1-2 litres of Ringer's Lactate in the adult patient and 20 ml/kg in the paediatric patient. Send blood for grouping and cross matching.
4. In case of open fractures, give intravenous antibiotics after sensitivity testing. Various combinations can be used but each should provide coverage for Gram-positive as well as Gram-negative organisms. The antibiotics should be continued for at least a period of 7-14 days.
   Inj. Cloxacillin 500 mg 6 hourly (50-100 mg/kg in children)
   Inj. Gentamicin 80 mg 12 hourly (5-7.5 mg/kg in children)
   Or
   Inj. Cefotaxime 1 g 12 hourly (100-200 mg/kg in children)
   Inj. Amikacin 500 mg 12 hourly (15 mg/kg in children)
   Or
   Inj. Ceftriaxone 1 g 12 hourly (50-100 mg/kg in children)
   Inj. Amikacin 500 mg 12 hourly (15 mg/kg in children)

The patient or parents should report to the hospital in case of severe pain in the limb, difficulty in moving fingers/leg or has sense of numbness, fingers/toes are swollen, any change in the colour of toes or finger nails, i.e. pale, dusky or blue, rashes in skin under plaster in perineal or buttock, in case of vomitings or abdominal distension develops in patient in a spica cast, pain in a localised area with discolouration of the distal organ, or reappearance of swelling (could be because of plaster sore) or if the plaster cracks, breaks or becomes soft.

Patient education

Following points should be explained to the patient after application of a plaster:

- The plaster immediately after application feels warm/hot during setting. Don't cover the plastered limb with clothing or bed sheet to allows the plaster to dry and to permit direct observation of the limb.
- Keep the limb elevated and keep on moving toes/fingers frequently
- In children to cover the edges of the plaster with water proof material

like polythene or plastic adhesive tape to avoid soiling of a hip spica or GT cast with urine or faeces.
- Not to bear weight on plaster unless permitted by the doctor, other wise it gets spoiled/cracked
- Avoid resting the plaster over any edge or hard surface to avoid dents and plaster sore.

References

1. Principles of Fractures and Dislocations. In: Rockwood and Green's Fractures in Adults. Charles A.Rockwood Jr, David P Green, Robert W Bucholz et al (eds), 4th Edition, Volume 1, 1996, Lippincott-Raven, Philadelphia, New York.
2. Complications of Fractures. In: Rockwood and Green's Fractures in Adults. Charles A.Rockwood Jr., David P. Green, Robert W. Bucholz et al (eds). 4th Edition, Volume 1, 1996, Lippincott-Raven, Philadelphia, New York.

PELVIC FRACTURES

Classification

Pelvic fractures are generally divided into two types based on amount of energy involved:

(i) Low energy fractures resulting in isolated fractures of individual bones of pelvis without disruption of pelvic ring.

(ii) High energy fractures generally producing pelvic ring disruption.

Evaluation

- Evaluate the patient with attention to ABCs of trauma care (i.e. airway, breathing and circulation). Conduct a primary survey and note baseline vital signs and neurological status.
- Assess pelvic stability, very carefully, by pushing anterior superior iliac spines towards each other and then apart (preferably perform this manoeuver once only).
- Perform perineal and digital rectal examination.
- Secondary detailed survey is carried out once the patients condition is stable and x-rays and other relevant investigations are done.

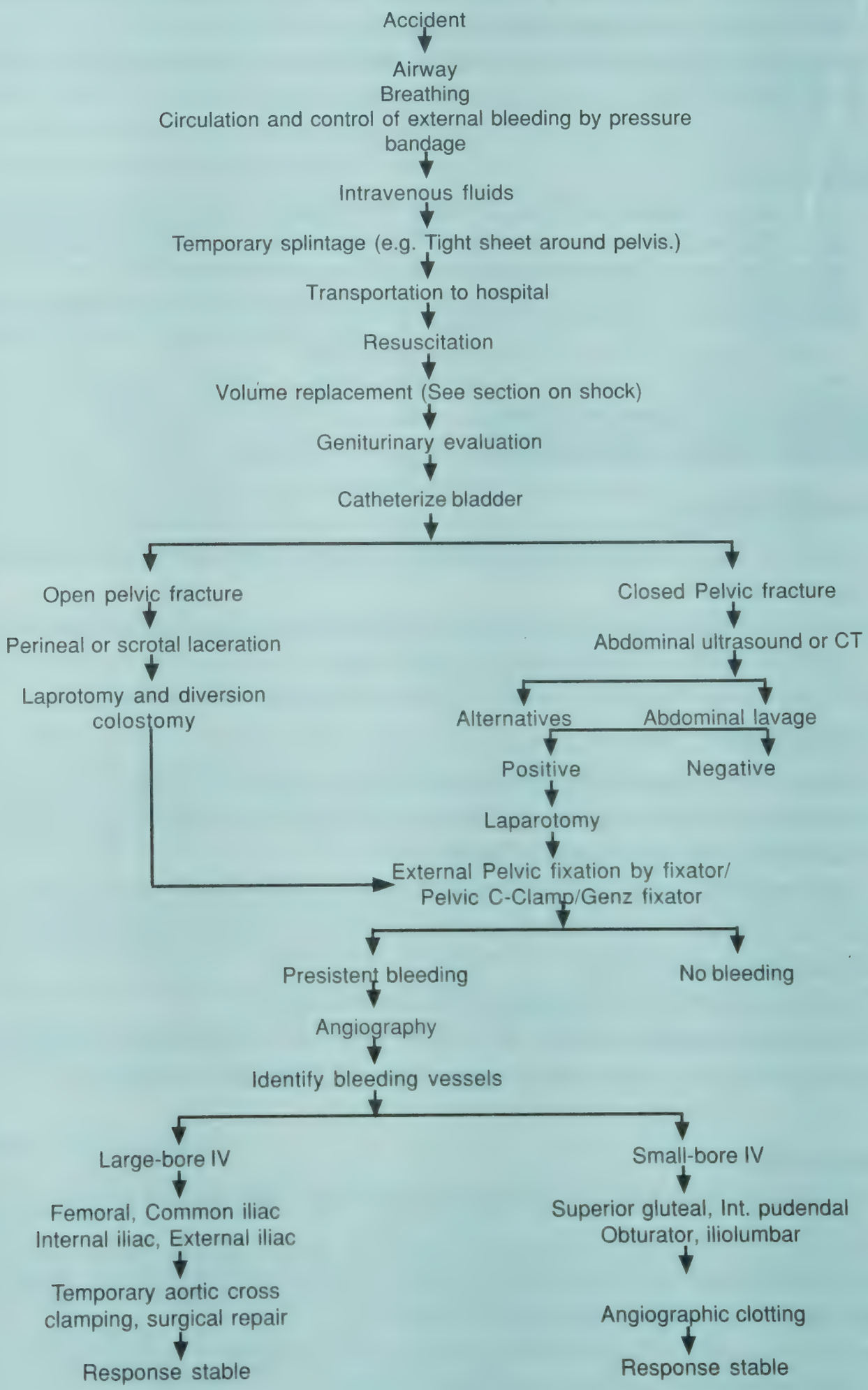
Treatment

As a primary aid, pelvis can be quickly and temporarily stabilised by wrapping a sheet tightly around it. Isolated stable pelvic bone fractures are treated by bed rest(for symptomatic duration) and analgesics, followed by gradual mobilization and weight bearing.

Treatment of unstable pelvic ring disruptions include (See Figure 1)

- Volume replacement (see section on shock)

Figure 1: ***Pelvic fractures: Therapeutic measures for the control of haemorrhage in the patient with a pelvic fracture***



- Control haemorrhage - Apply pressure dressing for conspicuous external bleeding. Open pelvic fracture wounds can be packed to control bleeding. Apply external fixator as a resuscitative measure in patients with demonstrable haemodynamic instability after an initial fluid bolus. As an alternative to fixator, pelvic clamp can be applied, but it is not a popular modality as complication rate with this clamp is higher than fixator (Pelvic clamp is contraindicated for iliac wing fracture close to the sacroiliac joint).
- Urological management – Catheterize the urinary bladder to document urinary output as a crucial determinant of adequate volume resuscitation. Blood at urethral meatus/inability to void urine/perineal haematoma/ high riding prostate/indicate uretheral injury. Microscopic haematuria indicates bladder contusion.

Further management is required in consultation with general surgeon.

- Gastrointestinal injuries – Concomitant small bowel/large bowel/rectal/ anal tears or perforation can occur. Peritoneal lavage and abdominal CT are required to exclude GI trauma with close pelvis fractures. Further management is required in consultation with general surgeon.

References

1. Fractures and Dislocations of the Pelvic Ring. In: Chapmans Operative Orthopaedics.

SNAKE BITE

There are more than 2000 species of snakes in the world and about 216 species are found in India out of which 52 are poisonous. It is estimated that annually about 2 lakh people are bitten, of whom around 16,000 die. The poisonous snakes found in India belong to the families Elapidae and Viperidae. The most common Indian elapids are *Naja naja* (Indian Cobra) and *Bungraus coeruleus* (Indian Krait). *Viper russelle* (Russells' Viper) and *Echis carinatus* (saw scaled viper) are the common Indian viperids.

Salient features

Although manifestations of the envenomization are complex, signs of neurotoxic effects predominate in patients bitten by elapids, while signs of vascular damage and alterations of blood coagulation are prominent features of a viperid bite.

Elapid envenomization

In the case of a cobra bite, pain and numbness at the site of the bite and

lassitude and drowsiness followed by a sense of clouding consciousness, growing dimness of vision, difficulty in breathing, weakening of pulse, tachycardia, drooping of eyelids and difficulty in speech. In the initial stages, there is dribbling of saliva, paralysis of the tongue and laryngeal muscles, and the patient passes into coma. At this stage, respiration ceases and convulsions appear, but the heart continues to beat for some time after respiratory paralysis.

Symptoms of krait envenomization are almost similar, but pain and swelling may be absent at the site of the bite with the result that even a suspicion of snake bite may not be aroused. Later on, however, the patient may complain of severe cramp like pains in the abdomen.

Viperine envenomization

After a viperid bite, there is a burning pain at the site, oedema accompanied by a painful lymphangitis and regional lymphadenitis, bluish purple tinge in the affected area 12 hours or more following the bite, with petechial haemorrhages and haematoma. This haemorrhagic tendency may result in epistaxis, melena, haematemesis and haematuria. In severe cases, vomiting and incontinence of faeces and urine may be seen followed by a fall in blood pressure resulting in an acute excitatory collapse, ending in death.

Diagnosis

- A bite from a venomous snake may show one or more punctures, a small abrasion and perhaps a linear laceration. Unless there is a semicircular row of teeth marks, the bite may not be assumed to be that of a nonvenomous snake. The pattern of fang marks is, however, of no help in ascertaining the amount of venom injected, severity of systemic poisoning and nature of poisoning - Elapidae or Viperidae venom. A local swelling appearing within a few minutes after the bite is an important sign of viper envenomization. The local sucking may also occur in the Indian cobra bite, although it usually does not appear until after 1-2 hours.

  The important early diagnostic criteria of systemic viper poisoning are blood stained sputum and nonclotting of blood. The early signs of an elapid envenomisation are ptosis and glossopharyngeal palsy.

Treatment

I. First Aid Measures

1. The aim is rapid and safe transport to a place where optimal medical care is available.
2. Ensure airway, breathing and intravenous access.

3. Reassurance.
4. Keep the patient warm, and at rest. Activity may enhance the spread of venom.
5. Immobilize the bitten limb by splinting the limb.
6. If possible, kill the offending snake and preserve it for identification.
7. For pain, a mild, nonsedating analgesic can be administered (aspirin or paracetamol).
8. A tourniquet (constricting band in the form of a strap or belt, etc.) can be applied lightly proximal to the bitten site to prevent lymphatic spread. It should be capable of admitting a finger beneath it. It is used till the patient is shifted to the hospital and approximately tied 10 cm above the bite. Once applied, the tourniquet should be loosened or removed only after antivenom administration has begun. A recent suggested modification to the tourniquet is a broad, firm constrictive bandage (elastic bandage) wrapped over the bitten area, including the entire limb with the limb placed in a splint.
9. Wipe the bitten site and cover loosely with a piece of clean cloth. As far as possible, avoid incision and suction since it increases the chances of wound infection, aggravates bleeding and may cause accidental severance of nerves, tendons etc. It may however be done if :
   (a) medical help is more than 1 hour away or
   (b) if it is decided to be done, avoid cruciate incision. Parallel incisions must be made through the fang marks, about 1 cm long and not deeper than 3 mm. Use of a commercial suction device is preferable to suction by mouth although some clinicians advocate cryotherapy (local application of ice), the general trend now is to discourage such a practice since it can enhance necrosis of tissue.

II. Identification of snake:

One or more of the following features indicates poisonous nature, if snake is available for examination:

1. Oval head with large scales (shields) or triangular head with small scales.
2. Broad ventral scales extending completely across the belly.
3. Tail short and tapering abruptly.
4. Scales on the undersurface of the tail (sub caudates) divided.
5. Third supralabial shield (i.e. upper lip scale) is the largest of the supralabials.
6. 4th infralabial shield (i.e. lower lip scale) is the largest of the infralabials.
7. Presence of control row of hexagonal vertebral scales.
8. Presence of hood in the neck.
9. Presence of fangs (i.e. modified long teeth, usually in the upper jaw, which may be grooved or channelized. Usually 2 in number, they are connected to the poison gland).

III. Hospital measures

Observe every case of alleged snake bite for at least 24 hours before discharging.

1. Check for and monitor the following:
   a. Pulse rate, respiratory rate, blood pressure and WBC count every hour.
   b. Blood urea, creatinine, WBC count.
   c. Urine output, urine for RBCs (in case of Viper bite).
   d. Vomiting, diarrhoea, abnormal bleeds.
   e. Extent of local swelling and necrosis.
   f. ECG, arterial blood gas analysis, BT, CT, PTT (to be repeated 6 hourly if abnormal).
2. Antivenom therapy

   Do not administer antivenom as a routine measure in every case of snake bite. It is associated with serious risks of anaphylaxis. It should be given only when features of envenomation are present. It is most effective in the first four hours although can be given upto 24 hours. The lyophilized powder is dissolved in distilled water or normal saline to make a clear solution before use.

   (CAUTION: Do not use if reconstituted solution is opaque to any extent).

Dosage regimen

Dose of antivenom varies from case to case. A rough guideline is as follows:

a) For bites with local swelling but no systemic features: 20-50 ml.
b) If the swelling has progressed beyond the bitten site and there are mild systemic features or bleeding diathesis: 50 to 100 ml.
c) If there are marked local and systemic features with haemolysis, clotting abnormalities etc: 100-150 ml.

For children, the dosage of antivenom should be reduced proportionately. Inj. hydrocartisone 200 mg and pheniramine maleate 22.75 mg should be given prior to the administration of antivenom to avoid allergic reactions.

Procedure

Always give antivenom intravenously. The appropriate dose must be added to 500 ml of saline and run as an infusion at a rate of 15 to 20 drops/min. The rate is progressively increased so that the infusion is completed in 1-2 hours. If there is no improvement, this is to be repeated.

(**CAUTION:** Do not inject the antivenom locally at the bite site since it is not effective. Always give a test dose before administration).

Test dose is given subcutaneously as 1:10 saline dilution of the antivenom (0.02 ml) on the extremity opposite to the bitten one. Similar injection of

only saline is given as control on the other extremity. The result is read at the end of 15 minutes. It is considered positive if there is erythema at the test site. In such cases, the antivenom should be administered only as a limb saving or life saving measure, beginning the infusion very slowly and desensitizing as below and keep adrenaline (0.5 ml of 1: 1000 dilution) in a syringe ready if required:

Time (min)	Antivenom (dose)	If there is no reaction	If reaction is present
15	0.1 ml IM	Go to next dose	Give adrenaline & hydrocortisone
30	0.5 ml IM	"	"
45	1.0 ml IM	"	"
60	0.5 ml IV	"	"
75	1.0 ml IV	"	"
90	5 ml IV	Resume infusion	"

Then resume the infusion of antivenom with continuous monitoring for features of allergy including anaphylaxis.

Other measures

1. Clean the bitten site with povidone-iodine solution, but do not apply any dressings.
2. Leave blisters alone. They will break spontaneously and heal. If there is local necrosis, excise and apply saline dressings. Surgical decompression may be necessary in some cases..
3. Tetanus toxoid injection must always be given
4. Prophylactic antibiotic.
5. Aspirin or other mild analgesic for pain.
6. Diazepam 5-10 mg for sedation in some cases.
7. Rehydration and nutrition.

Special measures

1. Whole blood or fresh frozen plasma, if there are clotting abnormalities and anomalous bleeding.
2. IV fluids, vasopressors etc. if there are features of shock.
3. Inj. Neostigmine 0.56 mg half hourly, if there are signs of neuroparalysis. Give Inj. Atropine 0.6 mg IV before every injection of neostigmine to block its muscarinic side effects.
4. Oxygen, assisted ventilation etc. if there is respiratory failure.
5. Renal failure must likewise be treated on appropriate lines if it develops.

References

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2. Emergency Toxicology. In: Management of Common Poisons. S.K. Gupta (ed), 2002, Narosa Publishing House.
3. Illness due to Poisons, Drug Overdosage and Envenomation. In: Harrison's Principles of Internal Medicine, Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2000, McGraw Hill Company Inc., New York 2000, pp 2505-2596.
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5. Disorders caused by Reptile Bites and Marine Animal Exposures. In: Harrison's Principals of Internal Medicine, Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2000, McGraw Hill Company Inc., New York, pp 2616-2622.
6. Snake Bite. In: Common Paediatric Emergencies. Post Graduate Institute of Medical Education and Research, Chandigarh, pp 71-77.

ANIMAL BITES

Bites of squirrels, hamsters, guinea-pigs, gerbils, chipmunks, rats, mice, other rodents, rabbits and hares almost never require anti-rabies treatment.

DOG BITES (RABIES)

Rabies can be transmitted by dog bites or licks of rabid animals on abraded skin and intact mucosa. Other animals which can transmit rabies are cat, monkey, horse, sheep, goat, mongoose, jackal, fox, hyena and bat.

Salient features

- Prodromal symptoms - such as headache, malaise, sore throat and fever last about 3-4 days. Pain and tingling at the bitten site.
- Stage of excitation - patient is intolerant to noise, bright light or a cold draught. Aerophobia may be present. Hydrophobia is a characteristic symptom of rabies. Examination shows increased reflexes, dilatation of pupils, increased sweating, lacrimation and salivation. Mental changes include fear of death, anger, irritability and depression. Convulsions may occur resulting in death.
- The last stage is that of paralysis and coma.
  The total duration of illness lasts for 2-3 days.

A. Treatment (Post exposure prophylaxis)

Every instance of human exposure to a suspected rabid animal must be

treated as a medical emergency. Irrespective of the class of wound, the combined administration of a single dose of antirabies serum with a course of vaccine along with local treatment of the wound is the best specific prophylactic treatment.

Specific indications for antirabies treatment are: if the animal shows signs of rabies or dies within 10 days of observation, the biting animal cannot be traced or identified, all unprovoked bites, Fluorescent Rabies Antibody (FRA) or test for Negribodies of the brain of the biting animal are positive and all bites by wild animals.

1. Local wound treatment must be done even if several hours or days have elapsed. The wound is immediately flushed and washed with plenty of soap and water. Punctured wounds should be irrigated with the help of catheters. Following this, apply 70% alcohol or povidone-iodine. Do not suture bite wounds immediately. If suturing is required, hold it for 24-48 hours, applying minimum number of stitches under the cover of antirabies immunoglobulin locally.
2. Antitetanus treatment can be given after local wound treatment.
3. Antirabies vaccination.

Post exposure vaccination depends on the degree of risk of rabies to which the person is exposed. In India, the classification of wounds is being followed as under:

Class I (Slight risk)

- Licks on healthy unbroken skin.
- Consumption of unboiled milk of the suspected animal.
- Scratches without oozing of blood.

Class II (Moderate risk)

- Licks on fresh cuts.
- Scratches with oozing of blood.
- All bites except those on head, neck, face, palms and fingers.
- Minor wounds less than 5 in number.

Class III (Severe risk)

- All bites or scratches with oozing of blood on head, neck, face, palms and fingers.
- Lacerated wounds on any part of the body.
- Multiple wounds 5 or more in number.
- Bites from wild animals.

Cell Culture Antirabies Vaccines

Inj. Potency - 2.5 IU/dose 1M (preferable site is deltoid). (**CAUTION:** Must not be given into the gluteus)

6 dose schedule (1 ml each).on days 0, 3, 7, 14, 28 and a booster dose on day 90. Rabies immunoglobulin is given along with 0 dose vaccine. Human rabies immunoglobulin 20 IU/kg or 40 IU/kg of rabbies immuneserum should be given.

In severe exposures (Class III) and all unprovoked bites by wild animals, in addition to steps 1, 2 and 3 as mentioned above give.
Human rabies immunoglobulin (HRIG) 20 IU/kg/dose, as a single dose. Prior sensitivity testing not required, Inject part of the dose around the wound and the rest by IM route in the gluteal region followed by a course of antirabies vaccine as above with additional booster doses of vaccines on 10, 20 and 90 days after completion of vaccine schedule with nervous tissue vaccine.

Or

Horse antirabies serum (when HRIG is not available) 40 IU/kg (maximum 3000 IU) after prior skin sensitivity testing, single dose on day 0. Half the dose is infiltrated around the bitten wound and the rest is given IM.
(CAUTION: During vaccination patient should avoid alcohol, glucocorticoids and chloroquine)

B. Post-Exposure treatment of persons previously vaccinated

- When the patients antibody titre is unknown or if the bite is severe, advise vaccination with cell culture on days 0, 3, and 7.
- If the antibody titre is known to be more than 0.5 IU/ml or if the bite is not severe, cell culture vaccine should be used on days 0 and 3 only.
- Antiserum immunoglobulin must not be administered systemically in patients who have previously had pre or post-exposure vaccination.

C. Pre-exposure prophylaxis

Indications - Laboratory staff working with rabies virus, veterinarians, animal handlers and wildlife officers.
Cell culture vaccine on days 0, 7, and 28. Booster doses are given if serum antibody levels drawn one month after the third dose show a titer less than 0.5 IU/ml.
Further booster doses should be administered at intervals of 2 years as long as the exposed person remains at risk.

References

1. Rabies Virus and other Rhabdoviruses. In: Harrison's Principals of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2000, McGraw Hill Company Inc., New York, pp 1149-1152.

INSECT AND ARACHNID BITES AND STINGS CAUSING SKIN DISEASES

Mosquitoes and other Biting Flies

Besides being vectors of several most important parasitic disease, including malaria, leishmaniasis, onchocerciasis and filariasis, mosquitoes and other biting flies can induce florid local lesions in susceptible persons.

Treatment

For papular urticaria

1. Tab. Cetrizine 10 mg once daily to relieve pruritis.
2. Topical antimicrobial preparation to prevent secondary bacterial infection (see section on pyogenic skin infections).

Bees, Wasps, Hornets and Ants

Bees, wasps, hornets and ants are species of Hymenoptera.

Treatment

1. Topical administration of calamine lotion for symptomatic relief.
2. Systemic antihistamines and analgesics can be given to relieve pruritus or pain.
3. Systemic corticosteroids may be appropriate if there are severe side-effects.
4. Any person who collapses, or who complains of wheezing, feeling of anxiety or faintness, generalized itching, or tightness in the chest within approximately 1 hour of being stung by an insect should be treated as having anaphylactic shock, (see section on anaphylactic shock).
   Inj. Adrenaline 1 mg (as hydrogen tartrate) 0.5-1.0 ml IM injection of Adrenaline (1:1000 solution) repeated every 15-20 min if required.

All patients should be observed at least for 24 hours for recurrent anaphylaxis.

Scorpions

Treatment

1. Simple analgesics, such as paracetamol and aspirin, can be given to relieve pain. However, because of the potential for severe reactions, every effort should be made to get the patient to a hospital as soon as possible.
2. Vasodilators, administered in a hospital setting within 24 hours of the attack, may attenuate the cardiovascular response and possibly reduce mortality.
3. In endemic area, species-specific antiscorpions sera may be available locally and this can be of value if administered within few hours.

Poisonous Spiders

Poisonous spiders are endemic in the tropics and the southern hemisphere where they typically inhabit woodpiles, outhouses and dark corners of garages and houses.

Treatments

1. Specific antivenoms.
2. Analgesics.
3. Muscle relaxants should be given to relieve pain and muscular spasms.
4. Oral corticosteroids, if administered within 24 hours of the attack, may reduce the risk of local necrosis and the incidence of disfiguring scars.

References

1. Drugs used in Skin Diseases. In: WHO Model Prescribing Information, 1997, WHO, Geneva.

3

CARDIOVASCULAR CONDITIONS

RHEUMATIC FEVER

A syndrome of inflammatory conditions occurring as a delayed immune response (2-6 weeks) to pharyngitis caused by *Group A Streptococci.* Commonly a disease of childhood between the age of 5-15 years.

Salient features

- Diagnosis is based on updated (1992) Jones criteria (two major or one major and two minor plus evidence of antecedent infection as positive throat culture/elevated ASO titres). Migrating polyarthritis, carditis, Sydenham's chorea, erythema marginatum and subcutaneous nodules (Major Jone's criteria). Minor criteria include fever, arthralgias, raised acute phase reactants and prolonged PR interval.

Treatment

Nonpharmacological

Bed rest for 2 weeks followed by gradual ambulation depending on severity of carditis.

Pharmacological

1. Tab. Aspirin 80-100 mg/kg divided in 4-6 equal doses after food.
2. In patients with evidence of severe carditis and congestive failure or pericarditis:
   Tab. Prednisolone 1-2 mg/kg for 4-6 weeks followed by administration of Aspirin (which should be started 1 week before stopping prednisolone).
   Duration of treatment for arthritis is 4-6 weeks and for carditis is 3-6 months.
3. Treatment of congestive heart failure, if present (see the section on CHF).
4. In case of chorea
   Tab. Haloperidol 0.05 mg/kg/day.
5. All patients with acute rheumatic fever should be treated with as if

they have group A *Streptococci* infection whether or not the organism is not actually recovered from culture.

Inj. Procaine penicillin 10 lac units/day IM

Or

Inj. Benzathine penicillin 1.2 MU single IM injection

Or

Oral penicillin B 500 mg twice daily for 10 days.

Secondary prophylaxis with

Tab. Penicillin V, 250 mg 2 times a day

Or

Inj. Benzathine penicillin 1.2 MU (if weight >37 kg) or 0.6MU (if weight <37 kg) IM every 3 weeks

Or

If patient is allergic to penicillin

Tab. Erythromycin 250 mg 2 times a day

Duration of prophylaxis

1. Rheumatic fever with carditis and residual valvular involvement atleast until 40 years or sometimes even lifelong.
2. Rheumatic fever with carditis and no residual valvular involvement, for 10 years or upto 21 years or whichever is longer.
3. Rheumatic fever without carditis, for 5 years or until 21 years whichever is longer.

Monitoring

1. Monitor blood levels of salicylates.
2. Watch for salicylate toxicity (ototoxicity, hyperventilation and metabolic acidosis).
3. Follow up for response to fever and decrease in acute phase reactants to reduce salicylates or taper steroids.
4. Echocardiography for monitoring complications of carditis.

Patient education

- Explain consequences of rheumatic fever and ensure monitoring to rule out residual valvular involvement and compliance with prophylaxis
- Patients with valvular involvement should report to cardiologist for evaluation and further management.
- Explain the importance of prophylaxis against rheumatic carditis as detailed earlier.

Reference

1. Acute rheumatic fever. In: Medicine International No.18, 1997, pp 100-105.

INFECTIVE ENDOCARDITIS

Infection of the endothelial surface of the heart with its attendant complications. Acute bacterial endocarditis (ABE) is usually caused by *S. aureus*, Group A haemolytic *Streptococci, Pneumococci or Gonococci.* Subacute bacterial endocarditis (SABE) is usually caused by *S. Viridans* or other *streptococci*, rarely by other organisms. Prosthetic valvular endocarditis (PVE) develops in 2-3 % of patients within 1 year, more in aortic valve than mitral and least with porcine valves. Early onset infections (<2 months) caused by resistant *S.epidermidis, coliforms, candida* etc. while late infections by low virulence organisms. ABE may affect normal valves, specially in intravenous drug addicts while SABE complicates deformed/damaged valves or congenital heart disease (CHD).

Salient features

- Fever, toxaemia, clubbing, splenomegaly, anaemia, microscopic haematuria, a new onset or changing murmur, evidence of immune phenomena and metastatic infection.
- Complications such as congestive heart failure (CHF), mycotic aneurysm, embolic cardiovascular accident (CVA) or other phenomena may be the presenting features.
- Definitive diagnosis requires positive blood cultures aided by positive echocardiogram (trans-esophageal positive in >90%).

Treatment (Infective endocarditis should be treated as a medical emergency)

Treatment should be started on clinical suspicion.

Presumptive initial treatment for SABE should cover *S. viridans*, microaerophilic and *anaerobic streptococci*.

Inj. Crystalline Penicillin-G 12-18 MU/24 hours after test dose + Inj. Gentamicin 3 mg/kg/day IV (or IM) 8 hourly for 2 weeks.

Enterococci

Inj. Crystalline Penicillin-G 18-30 MU/day after test dose (divided into 6 doses) + Inj. Gentamicin 1 mg/kg 8 hourly IV for 4-6 weeks.

Or

Inj. Ampicillin 12 g/day, given 4 hourly may be substituted for crystalline penicillin-G

In acute bacterial endocarditis, cover for *Staphylococci*:

Inj. Nafcillin 2 g IV 4 hourly 4-6 weeks.

In penicillin sensitive individuals

Inj. Cefazolin IV 8 hourly.

Or

Inj. Vancomycin 15 mg/kg IV 12 hourly.

Methicillin resistant *Staphylococcus aureus* (MRSA)

Inj. Vancomycin as above for 6-8 weeks + Inj. Gentamicin 1 mg/kg IV 8 hourly for 2 weeks + Cap. Rifampicin 300 mg orally 8 hourly for 6-8 weeks

(For treatment of congestive heart failure see section on CHF)

Follow up

Clinical response occurs in 3-7 days. Change the antibiotics as per culture/sensitivity report if required. Drug levels monitored for vancomycin and renal functions for both vancomycin and gentamicin.

Cardiac surgery is required if -

1. No response to medical treatment (specially in prosthetic valve endocarditis)
2. Worsening heart failure and the lesion is correctable
3. Acute onset cardiac complication due to infection e.g. septal perforation/valvular damage/stroke perivalvular extension of infection.
4. Large (> 1 cm diameter) hypermobile vegetation with increased risk of embolism.

Patient education

- Prophylaxis: When undertaking interventional procedures (dental extraction, upper respiratory tract) to take prophylactic treatment with following:

Cap. Amoxycillin 3 g orally 1 hour preoperatively or Cap. Clindamycin 600 mg 1 hour preoperatively.

Higher risk patients with prosthetic valves, genitourinary procedures

Inj. Amoxycillin 2 g IV + Inj. Gentamicin 120 mg IV before procedure followed by

Cap. Amoxycillin 1 g orally 6 hours postoperatively.

Substitute Vancomycin 1 g IV over 100 min in case patient is allergic to penicillin.

Reference

1. Prevention of Bacterial Endocarditis. Dajani AS, Taubert KS et al (eds), JAMA 1997; 277: pp 1794-1801.

ACUTE PERICARDITIS

Inflammation of pericardium, which may be acute or chronic and may

result in pericardial effusion. May be caused by viruses, bacteria, mycobacteria, connective tissue disorders, uremia, myocardial infarction (MI), malignancies, radiation and trauma.

Salient features

- Chest pain, dyspnoea, presence of friction rub, tamponade and serial ECG changes.

Treatment

Nonpharmacological

Bed rest.

Pharmacological

1. Tab. Aspirin 650 mg orally every 3 to 4 hours.

   Or

   Tab. Ibuprofen 400 mg orally every 6-8 hours for 1 week.
2. In the absence of relief within 48 hours (non-infective cases only) Tab. Prednisolone 20-60 mg per day for 3-4 days.
3. Antibiotics should be used only in case of documented purulent pericarditis emperically to cover *Pneumococci, Meningococci, Staphylococci, H. influenzae* (Ampicillin + Gentamicin) may be used.
4. Anticoagulants are not to be used except in case of prosthetic valves when Heparin may be used.
5. Treatment of primary disease causing pericarditis.

Complications of the pericarditis are pericardial effusion, constrictive pericarditis and recurrent pericarditis.

Pericardial effusion

Pericardial effusion occurs when pericarditis leads to accumulation of fluid in pericardial cavity. Echocardiography is diagnostic.

Treatment

- As above for pericarditis.
- Diagnostic tap for effusion.
- Pericardiocentesis in case of a large effusions or tamponade.
- Pericardiostomy with drainage for large effusions with rapid refilling.

Constrictive pericarditis is the restriction induced by a thickened fibrous pericardium as a sequelae of pericarditis. Tuberculosis is the commonest cause. Treatment is surgical excision. Pericardiectomy for recurrent pericarditis or constrictive pericarditis.

Treatment

1. Antitubercular therapy (for details see tuberculosis section)
2. Tab. Prednisolone 1 mg/kg for 2 weeks and then taper off in next 4 weeks.

Recurrent pericarditis may require intravenous methyl prednisolone pulses, colchicine 1 mg daily or pericardiectomy.

Monitoring

Monitor symptomatic relief so as to stop NSAIDs or taper steroids.
Watch for complications (clinical course, echocardiography, chest roentgenograms) and refer to a higher centre for appropriate management.
Ensure treatment of the underlying cause.

Patient education

- Reassurance that viral pericarditis is self-limiting with monitoring for complications is sufficient.
- Patients with tubercular or purulent aetiology must be educated to ensure compliance and adequate therapy.
- Myxedema must be adequately treated and emphasize the need for follow up and compliance.
- Uraemia, malignancy etc. require referral for specialized care and management.
- Rheumatic fever patients must receive prophylaxis and follow up at a higher centre for management of valvular involvement.
- Drug induced pericarditis must be prevented by educating the patient against future use.
- Emphasize the need for post myocardial infarction, follow up with echocardiography and other measures including life-style modification, drugs, revascularisation etc.

CARDIOMYOPATHY

Any structural or functional abnormality of the ventricular myocardium, excluding congenital/valvular structural defects, vascular (systemic/pulmonary), pericardial, nodal or conductive system diseases.

Dilated congestive cardiomyopathy

Commonest type of cardiomyopathy, usually caused by ischaemia and characterized by ventricular dilatation & systolic dysfunction. The other important causes include alcohol, endocrinopathies (diabetes, thyrotoxicosis), myocarditis or idiopathic.

Salient features

- Features of biventricular failure resulting in edema and dyspnoea.
- Diagnosis is clinical supported by ECG, chest X-ray and echocardiography.
- Carries a poor prognosis with 5 year survival of <70%.

Treatment

Symptomatic, management as in congestive heart failure (see section on CHF)
Treat any underlying treatable cause.

References

1. The Cardiomyopathies and Myocarditis. In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Kasper DL et al (eds), 15th Edition,2001, McGraw Hill Company Inc., New York, pp 1359-1365.

HYPERTENSION

Usually asymptomatic and discovered on routine measurement of blood pressure. Secondary hypertension (HT) presents as a part of a symptom complex as in acromegaly, Cushing's disease, renovascular or renal parenchymal disease, connective tissue disorders (SLE, scleroderma etc), or coarctation of aorta.

Salient features

- Nonspecific symptoms are fatigue, headache, epistaxis.
- Uncontrolled hypertension can lead to target organ damage (TOD) such as coronary artery disease (CAD), left ventricular hypertrophy (LVH), cerebrovascular accidents (CVA), transient ischaemic attacks (TIA), retinopathy, peripheral vascular diseases including dissecting aneurysm, renal disease.
- Associated risk factors are - age >55 years in males and >65 years in females, smoking, diabetes mellitus, hyperlipidaemia, family history, obesity, sedentary life style and ethnic group.

Precautions to be taken while measuring BP

- BP should be measured using an appropriate size cuff in both upper limbs and at least one lower limb in both supine and erect posture.
- Patient should have been resting for at least 5 minutes and should not

have smoked during the last 30 minutes before measuring the blood pressure.

Treatment

Nonpharmacological

- Salt restriction consisting of no added salt (reduce sodium chloride intake to 5 g/day).
- Restriction of dietary fats to achieve cholesterol standards.
- Life-style modification -exercise consisting of vigorous aerobic exercise like brisk walking, swimming or jogging at least 20 to 30 minutes at least 4 times a week with the heart rate reaching 65-70% of maximal heart rate.
- Weight control using a combination of dietary and exercise measures.
- Alcohol restriction.
- Cessation of smoking.
- Yoga.
- Control of other risk factors.

Pharmacological

Indications are:

- All patients with diastolic BP $\geq$ 100 mm Hg.
- Diastolic BP 90-99 mm Hg.
- Non-pharmacological measures fail in 3-6 months trial.
- Associated cardiovascular disease/ Target organ damage (TOD).
- Other risk factors.

How to start therapy?

Single Drug (step-wise approach) Vs combination of antihypertensive drug?

(Average reduction in BP with single drug is 15-20/7-15 mmHg)

Antihypertensive drugs-choice of therapy with single drug

a. Diuretics- elderly, obese, congestive heart failure (CHF).
b. Beta-blockers- young, coronary artery disease (CAD), vascular headache, associated atrial fibrillation (AF).
c. Calcium antagonists- old age, CAD, atrial fibrillation (AF), paroxysmal supraventricular tachycardia (PSVT).
d. Angiotensin converting enzyme inhibitors (ACE I)- young, left ventricular failure (LVF), diabetes.
e. Angiotensin II receptor antagonists- same as ACE I.
f. Alpha- blockers- prostatism, diabetes, dyslipidaemia.
g. Combined alpha & beta blockers- pregnancy.
h. Old drugs- alpha-methyl dopa (pregnancy), Clonidine-refractory cases.

Drug combination used for-

- Additive effect- use drug acting by different mechanisms.
- Minimization of the side effects-
  - -block opposing effects on homeostatic mechanism.
  - -block predictive side-effects.
  - -permits use of lower dose (less side-effects).

Fully additive drug combinations:

- Diuretic + beta-blocker.
- Diuretic + ACE I.
- Calcium antagonist + beta-blocker.
- Calcium antagonist + ACE I.

Questionable drug combinations

a. Nonadditive - beta-blocker + ACE I
- angiotensin II receptor antagonist + ACE I.

b. Side-effects additive
- beta blocker + Verapamil/Diltiazem (older Calcium antagonists).
- alpha blocker + calcium antagonists.

Drug combinations for patients with associated conditions:

HT with angina	-	Betablocker + calcium antagonist
HT with heart failure	-	Diuretic + ACE I
HT with diabetes mellitus	-	ACE I + calcium antagonist
HT with COAD	-	Diuretic + calcium antagonist

ISOLATED SYSTOLIC HYPERTENSION (Systolic BP>160 mm Hg)

Drugs of choice in order of preference are:

- Diuretics.
- Betablocker.
- Diuretic + betablocker.
- Diuretic + calcium antagonist.
- ACE I + calcium antagonist.

Hypertension in pregnancy

Diuretics, alpha-methyldopa, calcium antagonists
(ACE I & Angiotensin II receptor blockers are contraindicated).

Commonly used anti hypertensive drugs are:

Tab. Hydrochlorothiazide 12.5-25 mg once daily or 2 times a day

Or

Tab. Frusemide 20-40 mg twice a day

Or

Tab. Frusemide 20 mg + Spironolactone 50 mg 1-2 times a day

Or

Tab. Benzthiazide 25 mg + Triamterene 50 mg per day

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Or

Tab. Indepamide 2-5 mg daily

Or

Atenolol 25-100 mg daily or Metoprolol 25-150 mg 2 times a day. (**CAUTION:** contraindicated in asthma, peripheral arterial disease, moderate to severe congestive heart failure, uncontrolled hypothyroidism, myocardial conduction defects.

Or

Tab. Amlodipine 2.5-20 mg daily or Cap. Nifedipine 20-80 mg as sustained release daily.

Or

Tab. Enalapril 2.5 mg and may be increased to 40 mg daily or Lisinopril 2.5 to 20 mg daily or Ramipril 1.25 mg to 10 mg daily (CAUTION: may cause dry cough in some individuals).

Or

Tab. Losartan 25-50 mg once or twice daily.

Or

Tab. Prazosin 1-20 mg/day first dose to be given at bed time.

Or

Tab. Terazosin 1-10 mg daily in 2 divided doses. First dose to be given at bed time.

Or

Tab. Clonidine 0.05-0.6 mg 2 times a day.

Or

Tab. Methyldopa 250-1000 mg 2 times a day.

Accelerated hypertension (patients presenting with BP 200/140 mm Hg or more without papilloedema)

Inj. Enalapril 1.25-5 mg IV 6 hourly

Or

Inj. Nitroprusside 0.25-1.0 mcg/Kg/min IV infusion (dose to be titrated with BP, maximum dose for 10 mcg only)

Or

Inj. Nitroglycerine 5-100mcg/min infusion

Or

Inj. Hydralazine 10-20 mg IV or IM, if no response at 20 mg change the drug

Or

Inj. Labetolol 20-80 mg IV every 5-10 min upto a total of 300 mg, infusion 0.5-2 mg/min, oral 100-600 mg 2 times a day.

Or

Inj. Phentolamine 5-15 mg IV (specially useful in pheochromocytoma)

Malignant hypertension (patients presenting with BP 200/140 mm Hg

and evidence of vascular damage like papilloedema, derranged renal function) should be referred to a tertiary care centre.

Follow up

1. Regular BP monitoring to ensure optimal or normal BP in young or middle aged or diabetic subjects (130/85 mm Hg) and at least high normal BP in elderly patients (140/90 mm Hg).
2. Monitor all risk factors for coronary artery disease.
3. Ensure compliance with life-style modification.
4. Assess for complications and target organ damage.
5. In accelerated or malignant HT, avoid sudden fall in diastolic BP to below 100 mm Hg.

Patient education

- Explain consequences of uncontrolled HT and the need for the long term control with medication.
- Advise regarding control of other risk factors like diabetes, hyperlipaemia etc.
- Diuretics should be taken in the morning and if two doses a day are required second dose should be given before 4 PM.
- Manage target organ damage - referral to a higher centre for CAD (PTCA/CABG), nephropathy (prepare for dialysis or transplant), carotid Doppler to determine presence of atheroma and possibility of endarterectomy.

References

1. Mild Hypertension. In: Critical analysis of therapeutic approaches. Cleveland Clinc J of Medicine, 1989; pp 56:337-345.
2. JNC VI report: Circulation 1997
3. Arterial Hypertension. In: The Merck Manual, Mark H Beers & Robert Berkow (eds), Section 16, 1997, pp 1629-1648.
4. Hypertensive vascular disease. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), McGraw Hill Company Inc., 15th Edition, 2001, New York, pp 1414-1430.

ANGINA PECTORIS

Angina is clinical syndrome due to myocardial ischaemia, caused by critical obstruction in coronary arteries due to atherosclerosis, calcific aortic stenosis or rarely due to spasm/embolism.

Salient features

- Typical anginal pain is characterized by precordial or retrosternal discomfort or pressure, usually precipitated by exertion and relieved by rest and sublingual nitroglycerine. Pain may radiate to left shoulder, arm, neck or jaws.
- If anginal pain occurs at any time without any precipitating factor or increases in intensity or frequency, it is called unstable angina.
- Diagnosis is based on typical history, and may be confirmed if reversible ischaemic ECG changes are seen during pain. Exercise testing may be used to support the diagnosis in other cases. Other investigations includes echocardiography, radionuclide studies or coronary angiography.

Treatment

Nonpharmacological

Avoiding heavy exertion and take rest during acute stage, stop smoking, weight reduction if overweight.

Pharmacological

1. Tab. Isosorbide dinitrate 5 mg sublingual during the attack, dose repeated as required

   Or

   Tab. Nitroglycerin 0.3-0.6 mg sublingual
2. If attacks are more than twice a week, regular drug therapy is required. Tab. Isosorbide mononitrate 20 mg 2 times a day PO, may be increased to 120 mg per day is required.
3. If no contraindications exist Tab. Metoprolol 50 mg 2 times a day

   Or

   Tab. Atenolol 50 mg/day PO
4. If beta-blockers are contraindicated or angina persists Tab. Diltiazem 60-120 mg/day PO
5. Tab. Aspirin 100-150 mg per day PO

   Or

   Tab. Ticlopidine 250 mg 2 times a day

   If patient can not tolerate Aspirin Tab. Clopidogrel 75 mg/day, if available.
6. If still ischaemia is not controlled Tab. Nicorandil 5 mg 3 times a day can be started.

UNSTABLE ANGINA

(Patient should be hospitalized)

Initial management

1. Tab. Aspirin 300 mg stat. If aspirin is given before arrival at hospital, note saying that it has been given should be sent with the patient.
2. Inj. Nitroglycerine 5 mcg/min IV infusion, increase to dose by 2.5 to 5 mcg every few minutes until pain is controlled (monitor BP).
3. Continue other drugs as above
4. Inj. Heparin - unfractionated - 1000 U/h or low molecular weight heparin (enoxaparine) 1 mg/kg (0.6 ml for 60 kg) 12 hourly.
5. Angioplasty/CABG may be done if no relief with medication or disease is progressive.

Follow up

- Assess the risk factors like diabetes, obesity, hyperlipidaemia, hypertension, smoking and correct these factors.
- Correct anemia, if present.
- Worsening angina/unstable angina requires further investigation and should be referred to a higher center.

MYOCARDIAL INFARCTION (MI)

Salient features

- Sudden death is 1st manifestation in significant number of patients. Some patients may be asymptomatic and detected on routine ECG.
- Chest pain similar to anginal pain is the commonest symptom, usually begins at rest, no response to nitrates, lasts >20 minutes and patient may have associated dyspnoea, hypotension, sweating, altered sensorium and cyanosis. Diagnosed by typical ECG changes.

Treatment (preferably in CCU)

Nonpharmacological

Diagnosis should be made as soon as possible (within 20 minutes of arrival in hospital). Admit in CCU (if available), oxygen inhalation (4-6 litre/min), bed rest, ensure IV access, continuous cardiac monitoring, avoid visitors and outside influences. e.g. radio, newspapers.

Pharmacological

1. Inj. Morphine 2-4 mg IV, repeated 4-6 hourly, if needed.
2. Tab. Aspirin 150-325 mg PO administered on admission.
3. Tab. Nitroglycerine 0.3-0.6 mg sublingual.

First 24 hours

4. Confirm MI by cardiac enzymes estimation and ECG.
5. Thrombolysis should be done within 6-12 hours with following. There

is slightly increased risk of intracranial haemorrhage - if age >65, weight <70 kg, hypertension, and with TPA.
Inj. Streptokinase 250,000 units IV as loading dose over 30 min follwed by 100,000 units every hour for up to 12-72 hours.
Or
Inj. Urokinase 4400 U/kg IV over 10 min then 4400 U/kg every hour for up to 12-24 hours
Or
Inj. rt-PA 100 mg contrinuous IV infusion over 2 hours.

6. Primary PTCA may be done as an alternative to thrombolysis.
7. Close monitoring as mortality is maximum in the first 24 hours.
8. Adequate analgesia.
9. Limit physical activities at least for 12 hour.
10. Do not use prophylactic antiarrhythmics but should be readily available.
11. Inj. Heparin 1000 units/h IV infusion for 72 h (more useful with TPA).
12. Inj. Nitroglycerin as in angina if pain continuing and no hypotension, bradycardia/excessive tachycardia (24-48 h).
13. If no contraindication Inj. Metoprolol 2 mg IV every 2 minutes for 3 injections; if well tolerated follow with 50 mg PO started 15 minutes after last IV dose and given every 12 hourly for 48 hours. Then it may be changed to 100 mg once a day.
14. If no hypotension or contraindications and uncomplicated MI Tab. Enalapril 5 mg 2 times a day PO.
15. Measure serum lipids and electrolytes.

After first 24 hours

16. Continue aspirin, beta-blockers, nitroglycerine, heparin, ACE I, analgesia (if required).
17. Observe and treat any complication - high-dose aspirin if pericarditis, Diuretics if congestive heart failure, defibrillation (if haemodynamic compromise) of AF, atropine if blocks/bradycardia, intra-aortic balloon if severe hypotension.

Indication for urgent angiography/angioplasty

Ischaemic episodes (spontaneous/provoked) and preserved left ventricular systolic function.

Indications of temporary pacing:

Sinus bradycardia unresponsive to drugs, Mobitz type II AV block, Third degree AV block, Bilateral bundle branch block (BBB), Newly acquired BBB, and Bifascicular or trifascicular block.

Indications for urgent surgery:

- Failed PTCA with persistent chest pain or haemodynamic instability.
- Persistent or refractory ischaemia who is not a candidate for catheter intervention.

- Cardiogenic shock and coronary anatomy not amenable to PTCA.
- Mechanical abnormality leading to pulmonary edema/hypotension e.g., papillary muscle rupture or acute ventricular septal defect.

Discharge from hospital

Treadmill test - submaximal at 4-7 day or symptom limited (10-14 days)

Aim:

- To assess functional capacity and ability to perform work at home/work.
- Evaluate efficacy of current medical regimen.
- Risk stratification for future.

Long term management

- Aspirin, beta-blockers and ACEI (selected patients) - indefinite period.
- Achieve ideal weight.
- Control lipids (LDL <100 mg% with or without drug).

Patient education

- Advise patient to stop smoking, weight reduction, regular exercise (20 minutes brisk walk at least 3 times a week), restrict fat intake to control serum lipids.

References

1. AHA guidelines for the management of patients with acute myocardial infarction. Journal of Amer College of Cardiology, 1996; 28: 1328-1419.
2. Myocardial Infarction. In: The Merck Manual 1999; pp. 1668-1681.

CONGESTIVE HEART FAILURE (CHF)

Clinical syndrome of inadequate cardiac output resulting in fluid retention in the lungs, abdominal organs and peripheral tissue. Common causes include coronary artery disease, hypertensive heart disease, cardiomyopathy, valvular heart disease, and pulmonary vascular disease..

Salient features

- Dyspnoea and peripheral edema. Cyanosis may or may not be present,
- Raised JVP, S3 summation gallop and bilateral basal crepitations
- Profuse pink frothy sputum in severe cases.
- Tender hepatomegaly and ascitis

Treatment

- Since it is a syndrome, appropriate examination & investigations like chest x-ray, ECG, ABG and echocardiography should be done to identify the cause.

- Identify precipitating factor - arrhythmia's, fluid overload, thyroid disease, infection; anaemia, pregnancy, pulmonary embolism, dietary or medical noncompliance.

Nonpharmacological

- Restrict physical activity and bed rest in propped up position with a back rest.
- Oxygen inhalation - high flow oxygen 10 litres/min through facemask or 60% venturi mask.
- Dietary sodium restriction (2-3 g/day- no added salt in cooking and no table salt).
- Fluid restriction depending on output and other conditions.
- Dialysis or ultrafiltration or mechanical fluid removal (ascitic tap, paracentesis etc).
- Discontinue drugs with negative inotropic action (high dose beta-blockers, calcium-antagonists etc.).

Pharmacological

Consists of a judicious mix of vasodilators, diuretics and inotropic support.

1. In severe/acute cases Inj. Frusemide 40-80 mg IV stat and repeated after 2-3 hours. Individualise the maximum dose upto 200 mg/day. Maintenance dose is 40 mg IV 12 hourly till clinical improvement is seen.

   And

   Tab. Spironolactone 25-200 mg daily, may be used in combination with above.

   Or

   Tab. Chlorthiazide 250-500 mg/day.

   Or

   Tab. Indepamide 2.5-5 mg/day.

   Or

   Tab. Benzthiazide 25mg + Tab. Triamterene 50 mg/day.

   High dose of Frusemide infusion i.e. 10 mg/h undiluted and1 mg/h as continuous infusion can be used in refractory patient.
2. Tab. Enalapril 2.5-20 mg/day may be given as a single or two divided doses.

   Or

   Tab. Lisinopril 2.5-20 mg/day as a single daily dose.
3. Tab. Isosorbide mononitrate 60 mg/day preferably as slow release preparation given at night.
4. Digoxin is indicated in fast ventricular rate (e.g. in atrial fibrillation). Inj. Digoxin 1 mg IV, followed by 0.5 mg at 8 and 0.25 mg at 16 hours Or 0.5 mg followed by 0.25 mg PO at 8, 16 and 24 hours (rapid digitalization) followed by 0.125-0.375 mg/day as maintenance dose.

Or

Tab. Digoxin 0.5 mg first day, followed by 0.25 mg/day (slow digitalization)

5. Tab. Carvedilol 3.125 – 25 mg per day in single/or two divided doses (useful if persistent tachycardia, idiopathic dilated cardiomyopathy)- dose to be doubled, if required, only after 2 weeks.
6. Inj. Heparin 5000 U 12 hourly SC if the patient is bed ridden.

Monitoring

- Strict intake-output charting and daily weight as well as abdominal girth.
- Symptomatic relief and resolution of signs and symptoms of failure.
- Serum electrolytes & uric acid.

In case of refractory failure and for management of underlying cause, refer the patient to a higher centre.

Patient education

- Explain need to control salt intake and bed rest or regular compliance with medication.
- Patient should be advised to contact the physician if symptoms of digitalis toxicity e.g anorexia, nausea and vomiting or worsening of heart failure.
- Diuretics should be taken in the morning and if two doses a day are required second dose should be given before 4 PM.

References

1. Heart Failure. In: The Merck Manual . Beers MH & Berkow R (eds), 1999, pp 1682-92.
2. Heart Failure. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1319-1329.

PULMONARY EMBOLISM / INFARCTION

Salient features

- Pulmonary embolism may pass off unnoticed in case of a small embolism or present with a full blown acute cor pulmonale.
- Patients usually present with dyspnoea, tachypnoea, chest pain, haemoptysis and cough. Crepitations, rhonchi and occasionally pleural rub or signs of collapse accompanied by acute cor pulmonale, loud P_2, RV S_3, right ventricular heave, raised JVP, hepatomegaly, pedal edema, cyanosis, and dyspnea.
- ECG changes S1- Q3- T3 pattern, incomplete, RBBB or right

ventricular ischaemia.

- Predisposing factors for pulmonary embolism are surgery, immobilisation, trauma, oral contraceptives, pregnancy, postpartum, cancer, chemotherapy, stroke, indwelling venous catheter.

Investigations

- Chest roentgenogram- oligaemia in lung fields and typical wedge shaped infarction, arterial blood gas analysis.
- Lung scanning and pulmonary angiography, D-Dimer ELISA and latex agglutination, echocardiography, contrast plethysmography and venous ultrasound for deep vein thrombosis.
- Blood cultures in case of septic emboli.

Treatment

Primary therapy

A. Medical

1. Inj. Streptokinase 250,000 units IV as loading dose over 30 min followed by 100,000 units every hour for up to 12-72 hours.

   Or

   Inj. Urokinase 4400 U/kg IV over 10 mins - 4400 U/kg every hour for upto 12 to 24 hours

   Or

   Inj. rt-PA 100 mg continuous IV infusion over 2 hours.
2. Inj. Dobutamine IV infusion at the rate of 5 to 10 mcg/kg/min.
3. Oxygen 100% inhalation (except in cases of COPD/cor pulmonale)
4. Pain relief with NSAIDs or narcotics.

B. Catheter based suction embolectomy, local mechanical dispersion, local pharmacological thrombolysis.

C. Surgical embolectomy.

D. Secondary prevention

1. Inj. Heparin 5000 IU-10,000 IU over 5 minutes followed by an IV infusion at the rate of 15-25 units/kg/hour. Check prothrombin time (PT) after 6 hours and titrate INR to 1.5 to 2.3 times control. Complete blood count (CBC) for heparin associated thrombocytopenia (HAT).
2. Tab. Warfarin is initiated on the first day of documenting PT within therapeutic range in a dose of 10 mg daily for 2 days. The subsequent maintenance dose depends on PT with an overlap of 5 days with heparin (stop heparin when INR>2). A target INR of 2.0 to 3.0 is achieved and therapy is continued for at least a year.

   (**CAUTION:** Protamine sulphate is an antidote to overdosage with heparin with 1 mg neutralising 100 IU of heparin given within 75 minutes

(maximum 50 mg). Vitamin K 1-10 mg acts as an antidote to warfarin overdose.

3. Tab. Aspirin 80 mg/day following a full course of warfarin.
4. Inferior vena caval obstruction (IVC) with greenfield or bird's nest filter to prevent recurrent embolisation from deep vein thrombosis (DVT).

Monitoring and follow up

- Complete course of anticoagulant therapy with INR at regular intervals. First INR after 16 hours of warfarin.
- Inferior vena caval filters for recurrent emboli.
- Evaluate for hypercoagulable states such as protein C and S deficiencies, factor V leiden, antithrombin III deficiency, plasminogen deficiency, and elevated factor VIII.

Patient education

- Prophylaxis against deep vein thrombosis and pulmonary embolism in high-risk settings with graduated compression stockings, pneumatic compression, IVC interruption and heparin therapy.

References

1. Pulmonary Thromboembolism; In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1508-1513.

ARRHYTHMIA

Salient features

- Palpitations, anxiety, lightheadedness, angina, syncope or near syncope, hypotension and may lead to cardiac compromise.
- When severe, these may suggest underlying cardiac disease, ischaemic heart disease (IHD), cardiomyopathy, myocarditis, conduction disorders etc. or non cardiac (thyroid disorders, electrolyte imbalances or drugs)

These disorders are important to recognize for proper management. Arrhythmia's are frequently intermittent (paroxysmal) and may be classified based on

- Ventricular Vs supraventricular.
- Narrow QRS Vs wide QRS.
- Regular Vs irregular.
- Clinically benign Vs those associated with haemodynamic

compromise (lower the ejection fraction (EF), poorer the prognosis).
- Diagnostic tests include ECG during attack of arrhythmia or 24-hour Holter monitoring (if no abnormality seen in ECG on presentation).

Treatment

Identify and treat precipitating factors.

SUPRAVENTRICULAR TACHYCARDIA (PSVT)

Salient features

- Sustained regular narrow QRS tachycardia with normal appearing QRS (<120 msec) or may be broad QRS if there is aberrancy.
- Onset is sudden with heart rate being 160-200/min, presents with palpitation. Hypotension may occur in some patients. Polyurea may followthe episode.

Nonpharmacological

- Reassure the patient especially if no haemodynamic disturbance present at a time when the patient has symptoms.
- Vagal stimulation by drinking cold water, Valsalva manoeuver, carotid massage etc.

Pharmacological

Acute attack is treated as follows (if no response to vagal stimulation)

Inj. Adenosine 3 mg as a rapid IV push into the large peripheral vein, 3 mg over 2 seconds with cardiac monitoring, if necessary followed by 6 mg after 1-2 minutes, and then by 12 mg after a further 1-2 minutes followed by a saline flush.

(CAUTION: Contraindicated in 2nd and 3rd degree heart block)

Or

Inj. Verapamil 5-10 mg bolus over 2-3 min repeated at 15-30 min if necessary.

Or

Inj. Diltiazem 0.25 mg/kg slow IV repeated after15 min. It can be continued as an infusion 10 mg/h upto 24 h.

Or

Inj. Metoprolol 1-2 mg/min IV at 5 min interval upto a total of 5-10 mg.

Low energy (25-50 joules) DC shock may be used in resistant cases.

Maintenance treatment

1. Tab. Atenolol 25-100 mg/day as single or divided doses.

Or

Tab. Metoprolol 50-200 mg/day as a single dose or divided doses.

Or

Tab. Verapamil 40mg thrice a day.

Or

Tab. Amiodarone 150-200mg/day (in resistant cases).

Patient should be referred to a higher center for maintenance treatment/ definitive treatment.

SUSTAINED ATRIAL FIBRILLATION

It is characterized by sustained rapid irregular atrial rhythm. Mostly associated with underlying heart disease e.g. rheumatic heart disease, coronary heart disease, hypertension. Other non-cardiac causes include thyrotoxicosis, and alcohol ingestion.

Salient features

- Usually presents with severe palpitation, chest discomfort, weakness, breathlessness and some time signs/symptoms of arterial embolic phenomenon like stroke.

Treatment

Nonpharmacological

Reassurance, oxygen inhalation, propped up position if patient is dyspnoeic.

Pharmacological

1. Rapid digitalization done as in section on CHF followed by maintenance dose.
2. Tab. Warfarin 5 mg daily with titration as per INR (maintain about 1.5 to 2) in patients with documented clots or thromboembolic episodes. In cases of elective DC cardioversion (100 to 400 Joules), 3 weeks of anticoagulation required.
3. Treatment of underlying condition like thyrotoxicosis.

VENTRICULAR TACHYCARDIA

Salient features

Run of three or more consecutive ventricular beats at a rate ≥120 beats/min. If the rate of consecutive ventricular beats is >100/min,

it is called accelerated idioventricular rhythm which is a benign condition, usually occurring following the thrombolytic therapy. Diagnosis is made by ECG, suggested by independent P wave, fusion or capture beats, uniformity of QRS vectors in the V leads (concordance) & a frontal plain QRS axis > -30.

A. Haemodynamically stable –

Inj. Lidocaine 1 mg/kg IV bolus (3 ml) followed by repeated 0.5-1 mg/kg boluses at 5 min intervals upto a total of 3 mg/kg to attain desirable response followed by IV infusion 2-4 mg/min. Endotracheal or IM administration in extreme cases (300 mg).

If no effect of Lidocaine and DC conversion is not available,

Inj. Procainamide 15 mg/kg loading dose followed by 2-5 mg/min maintenance infusion.

B. Haemodynamically unstable VT or no response to lidocaine

Synchronized DC shock starting with 50–200 Joules.

C. In ventricular fibrillation

Unsynchronized 200 Joules followed by 360 Joules if required.

D. Maintenance treatment

Tab. Procainamide 250-650 mg 4 to 6 hourly.

Or

Tab. Flecainide 100 mg 8-12 hourly

BRADYARRHYTHMIA'S AND BLOCKS

Pharmacological

May be useful initially while pacing is organized

Inj. Atropine 0.5 - 2 mg IV repeated 4-6 hourly, if needed.

And/Or

Inj. Dopamine 5-20 mcg/kg/min infusion,

And/Or

Inj. Isoproterenol 2-10 mcg/min infusion.

Monitor the patient for improvement in pulse rate and blood pressure.

Definitive treatment is cardiac pacing.

Monitoring

- Shift patient on to appropriate oral drugs once the arrhythmia has been controlled.
- Monitor for drug toxicities and recurrences so as to titrate the dose
- Evaluate and refer for electrophysiological studies.
- Monitor INR for patients on anticoagulant therapy.

- Evaluate and refer for electrophysiological studies.

Patient education

- Emphasize need for compliance and regular follow up.
- Prepare for further intervention depending upon the cause. Valvular heart disease may be managed by repair or replacement. Reentrant tachycardia can be managed with radiofrequency ablation, coronary heart block requires temporary often followed by permanent pacing, coronary artery disease requires revascularisation.
- Emphasize need for compliance and regular follow up.

Reference

1. Tachyarrhythmias. In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Karper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1292-1309.

4
BLOOD

BLEEDING DISORDERS

The management of bleeding disorders is based on a precise diagnosis. If bleeding is life threatening, replacement of blood and fluids for haemodynamic stability takes priority.

Salient features

Suspect (a) vascular and platelet disorders - if prolonged bleeding from cuts, purpura and mucosal bleeding.
(b) coagulation disorders - if delayed bleeding from injury, bleeding into joints, muscles, and GIT.

Treatment

General measures

No intramuscular injections. No aspirin or nonsteroidal antiinflammatory drugs (NSAIDs). Apply local pressure to stop bleeding.

PLATELET DISORDERS (THROMBOCYTOPENIA)

Low platelet counts suggest either reduced production or increased destruction of platelets. In reduced platelet production, bone marrow examination shows reduced megakaryocytes and common causes are: megaloblastic anaemia, aplastic anaemia, marrow infiltration by malignancy. If bone marrow shows increased or normal megakaryocytes, it implies increased destruction as in idiopathic thrombocytopenic purpura (ITP), hypersplenism, disseminated intravascular coagulation (DIC).

Treatment

The primary cause to be treated.
Platelet transfusion is indicated mainly when platelets are not adequately produced and aim is to keep platelet count above 20,000/cu mm. If there is no fever and no clinical bleeding, even counts of 10,000/cu mm are acceptable. Transfusing platelets in ITP is not useful as these are rapidly destroyed, but platelet concentrates may be transfused in life threatening

bleeding before specific therapy takes effect.
Platelets are never kept in refrigerator. They can be stored at room temperature (22°C) on an agitator for upto 3-5 days. Once issued they should be transfused rapidly.
Dose: one single donor platelet collected by a pheresis raises platelet counts by 30,000 to 50,000 in an adult. One random donor platelet collected from a single unit of donated blood raises platelet counts by 5000-10000/cu mm in an adult. The rise is less in DIC, ITP, febrile patients and during active bleeding.

Idiopathic thrombocytopenic purpura (ITP)

Treatment

Tab. Prednisolone 2 mg/kg/day till response or 4-6 weeks and taper off slowly.

Or

Inj. Immunoglobulin 400 mg/kg/day for 5 days is as effective as steroids, response may be faster, but is much more expensive.
Failure with one therapy may still be followed by response to other therapy.
If there is poor response to the above, case must be referred to specialist centre for consideration of splenectomy.

PLATELET FUNCTION DEFECTS

If clinical presentation suggests platelet defect but platelet counts are normal, suspect platelet dysfunction. Bleeding time is prolonged in most cases. Platelet function tests will confirm the defect but facilities are not routinely available. Commonly caused by aspirin and NSAID use.

Treatment.

To stop NSAID use.
If active bleeding occurs, transfuse platelets.

COAGULATION DISORDERS

There is prolongation of coagulation parameters
(a) prolonged prothrombin time: in liver failure, Vitamin K deficiency, oral anticoagulants, disseminated intravascular coagulation,
(b) prolonged thrombin time, heparin use, DIC.

Treatment

Treat the underlying cause. If cause is not clear, give Vitamin K and

fresh frozen plasma (FFP) depending on investigation.
For overdose of oral anticoagulants or Vitamin K deficiency,
Inj. Vitamin K intravenous (use IV preparation) 10 mg IV once daily for 3 days or till response.
For infusion of plasma components refer to a specialist.
Fresh Frozen Plasma (FFP) contains all clotting factors present in blood. One bag/kg (average 4 to 6 FFP units in an adult) infuse rapidly and repeat every 12 hourly or as clinically indicated.
Cryoprecipitate contains factor VIII and Fibrinogen and may be used in Haemophilia and in DIC as replacement therapy. Factor VIII concentrates are needed for Haemophilia A (consult specialist).

References

1. Bleeding and Thrombosis. In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 354-360.

5

RESPIRATORY DISEASES

PNEUMONIA

The community acquired pneumonia is mostly seen caused by *Streptococcus pneumonae* (typical) or rarely *Mycoplasma pneumonae*, *H. influenzae, Chlamydia pneumonae, Staph. aureus* or *Legionella pneumophilia* (atypical). *H. influenza* infection is mostly in patients with chronic bronchitis. Nosocomial pneumonia is likely to be caused by gram-negative bacilli or *Staph. aureus*. Aspiration pneumonia is polymicrobial including anaerobes.

Salient features

- Productive cough, fever, chest pain. Systemic symptoms like headache, bodyache and delirium are more severe with atypical pneumonia.
- Diagnosis is confirmed by x-ray chest, sputum examination (gram stain and culture).

Treatment

Nonpharmacological

Adequate fluids, promoting expectoration (gravity drainage).

Pharmacological

Antibiotics are the mainstay of treatment-initial choice depends on clinical interpretation and may be modified based on response and sputum culture.

A. Community Acquired Pneumonia (CAP) in a young/ middle aged, otherwise healthy subject

Inj. Penicillin G 1-2 million units IV slowly 4- 6 hourly.

Or

Cap Amoxycillin 500 mg 3 times a day.

Or

Tab. Erythromycin 500 mg 6 hourly.

Or

Inj. Erythromycin 500 mg IV 6 hourly (Preferred if sensitivity to penicillin or when *Mycoplasma* or *Legionella* infection suspected).

Or

If Staph infection is suspected, Inj. Cefotaxime 1-2 g IV 8 hourly.

B. Elderly individual (immuno-competent) with CAP or nosocomial pneumonia

Inj. Cefotaxime 1-2 g IV 8 hourly.

Or

Inj. Ceftazidime 1-2 g IV 8-12 hourly.

C. Elderly individual (immunosuppressed) with CAP or nosocomial pneumonia

1. Same as (B).
2. Inj. Gentamicin 1-1.5 mg/kg IV 8 hourly.

Or

Inj. Amikacin 5 mg/kg IV 8-12 hourly.

D. Aspiration pneumonia

1. Inj. Penicillin G 1.0 million unit IV every 4-6 hourly.

Or

Cap Amoxicillin 500-750 mg 8 hourly.

Or

Same as (B), if aspiration occurs in the hospital.

2. Inj. or Tab. Metronidazole 400 mg 8 hourly.

Duration of treatment is 7-14 days.

E. Non-specific treatment if high fever and body aches (see section on fever)

Follow Up

Continue same antibiotic if good clinical response for 7-10 days. Change of antibiotic required only if culture results show resistance to given antibiotic and there is no clinical improvement. Repeat chest X-ray at 4-5 days interval and follow up X-ray to be done after 3-4 weeks of completing treatment.

Patient education

- Explain the importance of chest percussion and gravity drainage of sputum.

References

1. Pneumonia, including Necrotising Pulmonary Infection (Lung abscess). In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1475-1485.
2. Guidelines for the Management of Adult with Community-acquired Pneumonia - American Thoracic Guidelines. Am J Resp & Critical Care Medicine Vol 16, 2001, pp 1730-1754.

BRONCHIAL ASTHMA

A chronic inflammatory disease characterized by increased responsiveness of the airways to a number of stimuli resulting in their narrowing which is reversible spontaneously or with treatment.

Salient features

- Episodes of dyspnoea, cough and wheezing, lasting for minutes to hours.
- Triggering factors for acute attack include exercise, cold air, smoke, pollutants, stress, aspirin, birds/ animal droppings etc.
- Diagnosis is clinical and demonstration of reversible airway obstruction on pulmonary function tests. The treatment of asthma depends upon the severity of the disease.

Treatment

Nonpharmacological

Wherever possible, identify and avoid the trigger factor(s), stop smoking and do regular breathing exercises e.g. 'pranayama'. Desensitization therapy may help a few individuals.

Pharmacological

A. Very mild asthma (occasional cough/ wheeze, sensitive to respiratory infections etc.).

1. Salbutamol inhaler 200 mcg as and when required.
   (Use spacer device or rotahaler if coordination is a problem with the patient).
   Or
   Terbutaline inhaler 250-500 mcg as and when required.

B. Mild asthma (periodic symptoms, reacts to triggers, restricts activity 2-3 times a week).

1. Salbutamol/terbutaline inhaler as in (A) 2-3 times a day on SOS basis.
2. Beclomethasone inhaler 100- 200 mcg 2 times a day.
   Or
   Sodium cromoglycate inhalation 400 mcg 2-4 times a day.
   (More effective in young females with allergic diathesis).

C. Moderate asthma (daily wheeze, no significant diurnal variation, mild limitation of activity)

1. Same as (B) – needs bronchodilators regularly and increase dose of inhaled steroid to 800 mcg per day, if needed.
2. If no relief, Salmeterol inhaler 200 mcg twice a day instead of SOS.

3. Ipratropium bromide inhaler 200 mcg 2 times a day (added if no complete response to above treatment).
4. Tab. Etophylline + Theophyllinate 100-200 mg 3 times a day (if patient is still symptomatic despite above treatment (1-3) or nocturnal symptoms).

D. Severe asthma (daily wheeze, severe nocturnal symptoms, poor quality of life, off work/school, repeated hospitalizations)

1. Same as above.
2. Tab. Prednisolone 0.75-1 g/kg /day as single dose until symptoms are controlled. Taper it off by reducing the dose to half every 3-5 days and then maintain on inhaled Beclomethasone as above.

E. Severe acute asthma (severe wheeze, cannot complete sentences in one breath, may have mild cyanosis, RR > 25/min, HR ≥ 110/min, peak expiratory flow rate (PEFR < 50% predicted)

1. Hospitalize the patient.
2. Oxygen inhalation 50-60% with venturi mask initially and continue till the patient is better and not dyspnoeic. Intubate and ventilate if the patient is unconscious.
3. Salbutamol or terbutaline inhalation 2.5 ml to be nebulised. Repeat dose at 15 min if required during the 1st hour; hourly for next few hours till bronchospasm is controlled. Continue with 2-4 hourly doses as required.
4. Inj. Hydrocortisone hemisuccinate 100 mg 6-8 hourly IV.
5. If patient not receiving theophylline earlier and there is not adequate response to nebulised Salbutamol) Inj. Aminophylline 250-500 mg IV stat (given slowly over 20 minutes) followed by Aminophylline infusion at the rate of 0.5 mg/kg/hour.

F. Status asthmaticus or severe acute attack (silent chest, cyanosis, feeble respiratory efforts, bradycardia, hypotension, exhaustion, altered sensorium, PEFR <33% predicted)-

Refer immediately to a higher centre with ICU facility

1. Intubate the patient and give assisted ventilation
2. Start the treatment as in severe acute asthma

NOTE: A confused, restless or tired patient indicates impending respiratory failure. Monitor blood gases - a normal or increased CO_2 is a sign of respiratory failure and indicates need for close monitoring for intubation and ventilation. Chest X-ray must be done to ruleout pneumothorax.

Patient education

- Explain the chronic nature of the disease and need to continue the medication depending upon the severity of disease.
- Educate the patient regarding use of inhalers of different types, problems

of misuse of systemic steroids on long term basis without a definite indication.

- Educate the patient about common triggers, advise regarding reporting to hospital if acute attack does not responds to inhaled drugs at home.
- Stress on abstinence from smoking and avoidance of aspirin.

References

1. Asthma. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York , pp 1456-1463.
2. New Guidelines in asthma management. Editorial BMJ, 1997, 315-316.

CHRONIC OBSTRUCTIVE AIRWAY DISEASE (COAD)

COAD is defined as chronic obstruction to the airflow and includes a spectrum of disease with two ends being 'chronic bronchitis' (cough/ expectoration for at least 3 months in a year for 2 or more years) or 'emphysema' (distension of air spaces distal to terminal bronchiole with destruction of alveolar septae. The most important cause is inhalation of smoke, mostly from cigarette (80% of smokers get it), the other factors being air pollution, infections and genetic. Diagnosis is clinical, supported by chest X-ray and pulmonary function tests.

Treatment

Nonpharmacological

Cessation of smoking, avoiding inhalation of smoke from other sources (home or occupational), chest physiotherapy to help expectoration of sputum, postural drainage of sputum and adequate hydration.

Pharmacological

A. Severe acute bronchospasm

1. Oxygen inhalation (24-28%) with the venturi mask or through nasal prongs at flow rate of 1-2 litres/min.
2. Salbutamol solution 2.5 mg inhaled using nebulization 4 times a day and as and when required.
3. Inj. Aminophylline 250- 500 mg (5 mg/kg) dissolved in 20 ml of 5% dextrose given slowly over 20 minutes (not given if patient already receiving theophylline) followed by infusion at the rate of 0.5 mg/kg/h.
4. Inj. Ampicillin 1 g 6 hourly for 7-10 days.

Refer the patient to hospital for further treatment/assisted ventilation if no response to above treatment, severe cyanosis and/or altered sensorium.

B. Maintenance treatment

1. Salbutamol inhalation 200 mcg 4 times a day and as and when required

(use spacer if coordination is a problem for the patient).

Or

Terbutaline inhaler 250 mcg 4 times a day and as and when required.

2. If no complete response to the above
   Ipratropium bromide inhalation 200 mcg 2 times a day.
3. Tab. Choline theophyllinate 100-200 mg 3 times a day given after meals.
4. If patient is expectorating yellowish sputum Cap Amoxycillin 500 mg 3 times a day for 7 days.

Steroids have a very limited role in selected patients only, should be administered by the specialist.

Indication about home therapy of oxygen to be decided by the specialist and if indicated, should be taken for 15 hours a day.

Patient education

- Explain about importance of total cessation of smoking and its benefit not only during the acute stage but even about the long term recovery of lung functions.
- Patient should also be given 1 week dose of antibiotic and instructed to used if the symptoms start worsening with change in colour of sputum to yellow/green.

References

1. Chronic Bronchitis, Emphysema, and Airways Obstruction. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1495-1499.

BRONCHIECTASIS

Bronchiectasis is caused by permanent abnormal dilatation of one or more bronchi/bronchiole due to destruction of ciliated epithelium, elastic and muscular tissue. The destructive process may be initiated by primary microbial infection (necrotizing pneumonia, tuberculosis, aspergillosis etc.) or obstruction (foreign body, tumour, lymph node etc.) resulting in stasis and secondary infection.

Salient features

- Insiduous onset with chronic productive cough, increasing volume of sputum due to recurrent infections, haemoptysis, clubbing of fingers terminating in cor pulmonale and respiratory failure.

Treatment

Nonpharmacological

Stop smoking, physiotherapy in the form of chest percussion and gravity drainage to remove secretion, graded exercise. Routine deep breathing and maintenance of good nutrition.

Pharmacological

Aim is to take care of complicating infections (as indicated by purulent sputum, may be associated with blood) and management of associated bronchospasm if present

1. Cap Amoxycillin 50 mg/kg in 3 divided doses.

   Or

   Cap Amoxycillin + Clavulanic acid (625 mg 3) times a day.

   Or

   Cap Tetracycline 25-50 mg/kg/day in 3 divided doses.

   Or

   Tab. Cotrimoxazole 800 mg + 160 mg 2 times a day.

   The antibiotic choice is modified by gram stain and sputum culture and is given for 7-10 days.

   If *Staph aureus* suspected or isolated-

   Cap Ampicillin + Cloxacillin 1 g 4 time a day.

   Or

   Inj. Methicillin IV 4 times a day.

   If *Pseudomonas* isolated use atleast 2 effective antipseudomonal drugs

   Inj. Ceftazidime 1-2 g IV 8 hourly + Inj Gentamicin 3-5 mg/kg/day.

2. Salbutamol inhaler 200 mcg four times a day and SOS.
3. Tab. Etophylline + Theophylline 100-200 mg 3 times a day.

Surgery is indicated in case of uncontrolled haemoptysis and if the disease is localized to one lobe/lobule.

Observe for the improvement in amount and colour of sputum and constitutional symptoms. If no clinical response and sputum culture report is available, change the antibiotic accordingly. If bronchospasm is not relieved by metered dose inhaler, nebulization should be done.

Hospitalization is required for severe bronchospasm, a very sick patient or significant haemoptysis.

Patient education

- Emphasise on stoping smoking, annual vaccination against *pneumococcus*, prompt treatment of upper respiratory tract infections, physiotherapy, early antibiotic treatment if change in colour of sputum.

References

1. Bronchiectasis. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1485-1487.

COR- PULMONALE

Right ventricular dilatation and/or hypertrophy associated with pulmonary hypertension (PHT) secondary to disease of thoracic wall, pleura or pulmonary parenchyma.

Salient features

- Same as congestive heart failure.
- Diagnosis is made by clinical findings, chest x-ray, pulmonary function tests (PFTs), ECG, echocardiography.

Treatment

1. Treat the underlying cause.
2. Same as congestive heart failure (for details see section on CHF).

References

1. Cor Pulmonale. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1355-1359.

6

GASTROINTESTINAL DISEASES

RECURRENT ORAL APHTHOUS ULCERS

Salient features

- Single or multiple 1-15 mm size painful ulcers surrounded by erythematous mucosa occurring repeatedly any where in the oral mucosa (lip, tongue, soft palate or oropharynx). Usually heal in 1-2 weeks time.
- Rule out secondary causes like malabsorption syndrome, inflammatory bowel disease, Behcet's disease and recurrent trauma from tooth/denture and treat accordingly.

Treatment

Nonpharmacological

Oral hygiene (repeated mouth wash with plain water specially after eating any thing).

Pharmacological

1. Symptomatic treatment with application of any gel containing local anaesthetic before taking meals.
2. *Only in severe cases with large multiple ulcers.*
   Pellets Hydrocortisone 5 mg to be kept on the ulcer and sucked every 4 hours for 3-5 days.
   Or
   Tab. Prednisolone 0.5 mg/kg/day in a single dose for 3-5 days.

Patient education

- Maintain good oral hygiene.
- Avoid precipitating factors, if any.

References

1. Oral Manifestation of Disease. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 193-199.

ACUTE ORO-PHARYNGO-OESOPHAGEAL CANDIDIASIS

Commonly occurs as opportunistic infection in individuals with uncontrolled diabetes mellitus or immunosuppressed conditions (AIDS, malignancy, chronic steroid therapy, cytotoxic drugs). Usually caused by *Candida albicans.*

Salient features

- Discrete or confluent curdy white adherent plaques on the oropharyngeal/ oesophageal mucosa.
- Oral lesions are usually painless but oesophageal involvement produces painful dysphagia.
- Diagnosis is confirmed by demonstration of pseudohyphae on wet smears or culture.

Treatment

Susp. Nystatin local application in mouth and 100,000 units orally 4 hourly for 5-7 days.

Or

Soln Clotrimazole 1%to be applied locally for 5-7 days.

Or

Tab. Ketoconazole 200 mg once a day for 7 days.

Or

Tab. Fluconazole 100 mg/day for 10-14 days.

References

1. Inflammatory disorders. In: Harrison'sPrinciples of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1647-1649.
2. Oropharyngeal Anti-infective Drugs. British National Formulary, 2002; pp 530.

DYSPEPSIA

A syndrome of chronic or recurrent abdominal pain or discomfort in the upper abdomen. May be *organic* due to acid-peptic disorders, upper GI malignancy or *functional* which may again be classified as 'ulcer-like dyspepsia' (upper abdominal pain related to food intake), 'dysmotility type' (nausea, vomiting, belching, early satiety, bloating) or 'non-specific dyspepsia'. Organic dyspepsia excluded by history and upper GI endoscopic examination.

Treatment

Nonpharmacological

Avoid excess tea, coffee, alcohol and smoking and anything in the diet that precipitates symptoms.

Pharmacological

Ulcer-like dyspepsia

Tab. Ranitidine 150 mg 2 times a day for 4-6 weeks.

Dysmotility type dyspepsia

Tab. Domperidone 10 mg 3 times a day for 4-6 weeks (to be taken 30 minutes before meals).

Or

Tab. Mosapride 2.5- 5 mg 3 times a day for 4-6 weeks (to be taken 30 minutes before meals).

Nonspecific dyspepsia

Any of the above drug given alone or in combination and assess for clinical response after 4 weeks of the treatment.

If *H. pylori* positive (serology or any other test), treat infection with triple regimen (see section on peptic ulcer).

Follow up

Short courses (4-6 week) of the drug may be repeated or alternative drug tried if patient comes back with relapse after stopping the drug. Long term treatment may be continued for upto a year and to rule out organic cause.

Investigate fully before starting treatment if patient's age is more than 45 years, has anaemia and weight loss.

Patient education

- Avoid precipitating factors.

References

1. Functional Dyspepsia: Clinical Management. In: Approach to patients with Chronic Gastrointestinal Disorder. E Corazziari (ed), 1999, Messaggi SRL Milano Itali, pp 255-69.
2. Nausea, Vomiting and Indigestion. In: Harison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 236-240.

GASTRO-OESOPHAGEAL REFLUX DISEASE

A common disorder caused by retrograde flow of gastric contents through an incompetent gastro-oesophageal junction.

Salient features

Retrosternal pain, heart burn and regurgitation mostly occurring after meals. Rarely may present with chronic cough, laryngitis recurrent pulmonary infections specially in children and bronchospasm.

- Disease is classified as mild if endoscopy reveals no or minimal oesophageal mucosal inflammation and moderate- to- severe if there are ulcers with or without stricture formation in distal oesophagus.
- Diagnosis is by history, upper GI endoscopy. 24-h pH monitoring required in difficult cases.

Treatment

Nonpharmacological

'Life-style modification' like weight reduction if obese, elimination of fatty foods, avoiding alcohol, smoking, excessive consumption of tea/ coffee, elevating head-end of the bed, taking early dinner (2-3 hours before sleep).

Pharmacological

A step wise approach as indicated below:

Mild gastro-oesophageal reflux

1. Antacid Gel (with or without alginate) 10-15 ml or 2-3 tablets (chewed) taken 4-6 times a day ½ to 1 hour after meals may be given for a long time depending upon patients symptoms. If no relief add (2) and/or (3)
2. Tab. Domeperidone 10 mg 3 times a day 30 minutes before meals for 4-6 weeks or even for longer if needed.

   Or

   Tab. Mosapride 5 mg 3 times a day 30 minutes before meals for 4-6 weeks or longer if needed.
3. Tab. Ranitidine 150 mg 2 times a day 30 minutes before meals for 4-6 weeks.

Follow up

Ranitidine courses may be repeated or continued for several months if patient relapses while on antacids or Domeperidone/Mosapride.

Moderate- to- severe gastro-oesophageal reflux disease (endoscopically proved erosive oesophagitis)

1. Cap. Omeprazole 20 mg once daily 30 minutes before meals for 4 weeks, followed by further 4-8 weeks if not fully healed.

   Or

   Cap. Lansoprazole 30 mg 2 times a day 30 minutes before meals for 3 months.

Or

Tab. Pentoprazole 40 mg 2 times a day 30 minutes before meals for 3 months.

Follow up

Repeat endoscopy after 3 months to confirm healing of oesophagitis. If healed, continue maintenance treatment as in mild reflux disease or single daily dose of 10-20 mg Omeprazole (or any other PPIs).
Refer to the specialist if no or inadequate response

Patient education

- Explain about chronic nature of the illness, role of weight reduction and early small night time meal
- Wearing tight clothes around the abdomen may also increase the reflux.

Reference

1. Management of GERD in Adults. In: Approach to Patients with Chronic Gastrointestinal Disorder'. E Corazziari (ed), 1999, Messaggi s.r.l. Milano Itali, pp 255-69.
2. Oesophageal symptoms and Motility Disorders. In: Medicine International. Jewell DP & Thillainayagam (eds), 1998, The Medicine Publishing Co. Oxford, UK pp 1-6.
3. Nausea, Vomiting and Indigestion. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, Mc-Graw Hill Companies Inc., New York, pp 236-240.
4. Disease of the Oesophagus. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, Mc-Graw Hill Companies Inc., New York, pp 1642-1649.
5. Gastrooesophageal reflux disease. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, Mc-Graw Hill Companies Inc., New York, pp 1645-1647.

PEPTIC ULCER

Acid-pepsin related ulceration of mucosa of stomach and duodenum.

Salient features

- Sharp or gnawing epigastric pain, may be worsened (gastric ulcer) or relieved by intake of food (in duodenal ulcer). Nocturnal pain commonly awakens the patient at midnight but early morning pain is very rare. Symptoms are recurrent and periodic.
- Complications include upper GI bleed, perforation and gastric outlet obstruction. 95% of duodenal ulcers and 60% of gastric

ulcers are related to *H. pylori* infection and remaining are related to NSAID intake.

- Diagnosis of peptic ulcer is confirmed by upper GI endoscopy . *H. pylori* infection may be diagnosed by serology, rapid urease test, histopathology of antral mucosa or C^{13} breath test.

Treatment

Nonpharmacological

Stop smoking and avoid/ minimize intake of NSAIDs or switch over to a safer NSAIDs.

Pharmacological

It is recommended that the presence of *H. pylori* is confirmed before starting eradication treatment.

Preferred one week triple therapy for eradication of *H. pylori* regimen

1. Tab. Omeprazole 20 mg 2 times a day.
2. Tab. Clarithromycin 500 mg 2 times a day.
3. Cap. Amoxycillin 1 g 3 times a day.

All medicines to be taken 15-30 minutes before meals.

Alternative regimen

Replace Tab. Clarithromycin with Tab. Metronidazole 400 mg 3 times a day or Tab. Tinidazole 600 mg 2 times a day given after meals.

Symptomatic treatment

Tab. Ranitidine 300 mg single dose 30 minutes before dinner for 6 weeks.

Or

Tab. Omeprazole 20 mg single dose 30 minutes before breakfast for 6 weeks.

Follow up

To report to the physician urgently if vomiting of blood or passage of black tarry stools. Refer to a specialist if pain becomes continuous, frequent vomiting or symptoms of GI bleed.

Patient education

- Patient should avoid frequent use of unsupervised pain killers. If these are required on long term basis, a safer drug should be taken in consultation with a doctor.
- Smoking should be stopped
- There is no role of bland diet or drinking cold milk in the treatment of peptic ulcer.

References

1. Peptic Ulcer disease and Related Disorders. In: Harrison's Principles of Internal

Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1649-1665.
2. Gastritis and PepticUlcer. In: Medicine International. Jewell DP & Thillainayagam (eds), 1998, The Medicine Publishing Co. Oxford, UK, pp 11-15.

VOMITING

Nausea is the unpleasant feeling that one is going to vomit. Vomiting is the forceful expulsion of the gastric contents due to involuntary contraction of abdominal musculature and simultaneous relaxation of gastric fundus and lower oesophageal sphincter. Regurgitation is spitting up of the gastric contents without associated nausea or forceful contraction of abdominal musculature.

Causes of vomiting

a. Central (due to stimulation of vomiting center)-neurological diseases, raised intracranial pressure, vestibular system disorders, drugs and toxins, any acute severe pain, toxic or metabolic disorders like ketoacidosis, systemic infections, radiation exposure, pregnancy and psychogenic vomiting.
b. Peripheral-obstructive lesion of GIT, acute gastritis or gastroenteritis, severe upper GI bleed etc.

Salient features

- Excessive vomiting causes loss of salt and water and exhaustion while chronic recurrent vomiting prevents eating and causes starvation. Severe nausea and retching may result in upper GI bleed by causing Mallory Weiss Tear in oesophagus/cardia of stomach.
- A detailed history and clinical examination usually gives a clue to the cause of acute vomiting. For chronic and recurrent vomiting, investigation should be done to exclude a local cause in the GIT, evidence of raised intracranial tension (ICT) or presence of any other neurological condition. Psychogenic vomiting is diagnosed by exclusion of organic causes only.

Treatment

Nonpharmacological

- Acute gastroenteritis is usually self-limiting. Advise the patient to take sips of cold water/ORS.
- Prevent motion sickness by avoiding heavy meal before travel.
- Give rest to the injured part to prevent severe pain.

Pharmacological

Treat the underlying cause (medically or surgically).
Hospitalize the patient to give IV fluids if dehydrated. Start oral fluids as soon as patient can tolerate.
Appropriate analgesics if patient has severe pain.

- For symptomatic relief -

  In acute vomiting in the absence of obstruction to GIT or other organic cause, give

  Inj. Metoclopramide 10 mg IV and repeat after 6 hours, if needed.

  Or

  Inj. Prochlorperazine 5 mg IM, repeated after 4-6 hours, if needed.
- In patients with recurrent vomiting due to gastroperesis (as in diabetes), non-ulcer dyspepsia, give

  Tab. Mosapride 5 mg 3 times a day.

  Or

  Tab. Domperidone 10 mg 3 times a day.

  Or

  Tab. Metoclopramide 10 mg 3 times a day.
- To prevent motion sickness, give

  Tab. Cyclizine 50 mg upto 3 times daily. In children: 6-12 years 25 mg upto 3 times daily to be taken half an hour before starting journey.

Patient education

- Advise the patient to prevent food poisoning, not to take drugs like pain killers frequently
- Patient should be encouraged to take small sips of liquids at short intervals to prevent dehydration.

References

1. Nausea, Vomitings and Indigestion. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 236-239.

CONSTIPATION

Commonest cause of constipation is habitual, the important contributory factors being insufficient dietary fibre, physical inactivity, suppression of defaecatory urges occurring at inconvenient moments, prolonged travel etc. Constipation may also occur following an attack of diarrhoea on the

day after taking a purgative; this needs no treatment. The important secondary causes may include neurological, hormonal, colonic malignancy, depression. Secondary causes should be looked for in case of recent onset of constipation of severe symptoms.

Salient features

Constipation is defined as decrease in frequency and liquidity of stool compared to the normal pattern in a particular individual. Important complaints suggesting constipation include straining at defaecation >25% of time, lumpy/hard stools, sensation of incomplete evacuation, or less than 3 bowel actions per week.

Treatment

Acute constipation may be part of a more serious illness such as acute bowel obstruction. In that case patient has abdominal pain, vomiting and distension and cannot pass even wind (flatus). Immediately refer such cases to a higher centre. Treatment of habitual constipation is discussed as under:

Nonpharmacological

- Reassurance since many patients with normal stools and in pregnancy imagine that they are constipated.
- High fibre diet and increased intake of fluid with decrease in consumption of caffeinated drinks,
- Retraining of bowels (avoiding suppression of urge to defecate, making a regular habit).
- Bulk forming agents like 'isapghula husk' or 'psyllium seeds' also help to relieve mild constipation.
- Regular physical exercise such as walk for 1/2 to 1 hour daily and abdominal exercises.

Pharmacological (Usually required for moderate to severe constipation)

1. Lactulose Soln 15-20 ml orally at night.

Or

Susp. Magnesium sulphate 15-20 ml at night.

Or

Tab. Sodium picosulphate 10 mg at night.

Or

Isotonic polyethylene glycol (PEG) electrolyte solution 125-250 ml.

Any of these may be given 2-4 times a week. Some patients may require treatment for several weeks or months if there is no improvement.

2. Tab. Mosapride 5 mg 2 or 3 times a day. In some patients may be required for several weeks.
3. Phosphate enemas to be used on *as* & *when* required basis in patients having acute problem with severe constipation or sub-acute intestinal obstruction.

Follow up

- If patient continues to have severe constipation or symptoms worsen, refer the patient to a specialist for investigations to rule out secondary causes.
- Recent unexplained constipation (not acute) in an elderly person whose bowel habits were always regular should be investigated.
- Acute constipation especially when the patient is vomiting, has not passed even wind and appears ill, suspect GIT obstruction and refer immediately to a higher centre.

Patient education

- Do not use purgative frequently to treat constipation as it may form a habit
- Do not use purgatives to treat constipation with fever and following heart attack. A suppository or simple enema is preferred.
- In pregnancy ispaghula is preferred.

Reference

1. Constipation. In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 248-250.
2. Medicine International. Jewell DP & Thillainayagam (eds). The Medicine Publishing Co. Oxford, UK.

IRRITABLE BOWEL SYNDROME (IBS)

A group of gastrointestinal symptoms associated with lower bowel that occur in the absence of organic disease.

Salient features

- A positive diagnosis of IBS is made using Rome II Criteria: at least 3 months continuous or recurrent symptoms of abdominal pain associated with any 2 of the three features viz. relief by defaecation and/or onset with change in stool frequency or consistency.

- The supportive symptoms of IBS include passage of mucus, abnormal stool passage (straining, urgency of feeling of incomplete evacuation) and feeling of abdominal fullness. There should be no alarm symptoms like fever, weight loss, bleeding per rectum or anaemia.

Treatment

Nonpharmacological

Diet should contain high fibre and supplemented with bulk forming agents like ispaghula husk, avoid caffeine and alcohol, assess for lactose intolerance, avoid any other dietary constituent if that worsens the symptoms. Hypnotherapy and modified form of psychotherapy may reduce symptoms.

Pharmacological

1. Tab. Mebavarine hydrochloride 270 mg 3 times a day given for long term
   Or
   Tab. Drotavarine 40-80 mg 3 times a day
   Or
   Tab. Propanthaline hydrochloride 15 mg 3 times a day
2. In individuals complaining of symptoms suggestive of depression
   Tab. Amitriptyline 25 mg at bed time or 2 times a day
3. In case of severe diarrhoea, if symptoms are not controlled by above drugs, give
   Tab./Cap. Loperamide hydrochloride 2-4 mg daily for several days/ weeks depending upon the clinical response.

This should be considered only as temporary management. The final goal of treatment is gradual withdrawal of medication with substitution of a high-fibre diet.

Follow up

Symptoms of IBS are life long but vary in intensity. Pharmacological treatment should be titrated according to the severity of symptoms.

Patient education

- Explain the chronic nature of symptoms
- Patient should try to find out correlation of symptom with certain food item, specially milk ingestion and should avoid these.
- Stressful situation also worsen symptom. Relaxing exercises like yoga may help.

Reference

1. Irritable Bowel Syndrome. In: Medicine International, Jewell DP & Thillainaygam A.

(eds), Vol. 22, 1998, The Medicine Publishing Co. Oxford, UK, pp 102-104
2. Clinical approach to Irritable Bowel Syndrome. In: Approach to patient with Chronic GI disorders, 1999, pp 323-29.
3. Irritable Bowel Syndrome. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1692-1694.

ACUTE DIARRHOEA/GASTROENTERITIS

It is a self limiting illness characterized by diarrhoea, abdominal cramps, nausea and vomiting, usually caused by viruses or bacteria (*E. coli*, Cholera, *Staph. aureus, Bacillus cereus* etc). Most of these are noninvasive or toxic diarrhoeas. Less commonly patients present mainly with diarrhoea with passage of mucus and/or blood in stools. This may be associated with significant systemic symptoms like fever, malaise etc. These patients are more likely to have invasive diarrhoea caused by the bacteria (*E. coli, Shigella, Salmonella, Campylobacter* etc) or parasite (amoeba).

Treatment

In acute gastroenteritis dehydration and electrolyte imbalance is the main problem which needs attention and there is no need to go for aetiological diagnosis. Investigations are indicated if there is bloody diarrhoea, clinical evidence of toxicity or prolonged diarrhoea.

Nonpharmacological

Mainstay of treatment is adequate fluid replacement in any form. To prevent vomiting patient should be asked to take only sips of fluid. Fluids used at home can be juices, soups and glucose/electrolyte drinks (oral rehydration solution). Milk and its products should be avoided initially because of secondary lactase deficiency.

Pharmacological

1. **Indicated only in very ill patients with systemic symptoms** associated with bloody diarrhoea, traveler's diarrhoea or in cholera infection Tab. Ciprofloxacin 500 mg 2 times a day for 3-5 days.
2. **In amoebic dysentery**
   Tab. Metronidazole 800 mg 3 times a day for 7 days.
   Or
   Tab. Tinidazole 600 mg 2 times a day for 7 days.
   In acute Giardia infection
   Tab. Metronidazole 400 mg 3 times a day for 3 days.

Indications for hospitalization

Patients with clinical signs of dehydration specially young children or elderly, suspected cholera, immunosuppressed patients and those with severe systemic symptoms.

Patient education

- Patients should be instructed to continue taking adequate fluids even if it initially causes slight increase in frequency of stools due to increased gastro-colic reflex.
- They should report to the physician if they are not able to retain any fluid taken orally and develop significant decrease in urine output.

References

1. Gastroenteritis. In: Management of Common GI Problems. R Guan, J Kang and H Ng (eds), 1995, Medimedia Asia Pvt Ltd., Singapore, pp 68-75.
2. Diarrhoea & Constipation. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 241-250.

CHRONIC DIARRHOEA

A patient is diagnosed as having chronic diarrhoea if patient continues to have diarrhoea for more than 2 weeks.The important causes of malabsorption in India include tropical sprue, tuberculosis and chronic pancreatitis. Patient will need to be investigated by a specialist to diagnose the cause of chronic diarrhoea. Tests for malabsorption include fecal fat excretion study, D-xylose absorption, small bowel contrast studies and mucosal biopsy, structural and functional evaluation of pancreas. Diagnosis of ulcerative colitis is confirmed by colonic endoscopy and mucosal biopsy.

Salient features

- It may be classified as small bowel diarrhoea (bulky, greasy, frothy, foul smelling stools associated with lot of flatulence- indicating malabsorption) or large bowel diarrhoea (loose/watery stools mixed with mucus and/or blood- commonly caused by irritable bowel syndrome when without blood or inflammatory bowel disease).

Treatment (To be treated by a specialist)

Can be planned only after a proper diagnosis is made. Use of anticholinergics or nonspecific anti-diarrhoeal agents should be discouraged in the absence of proper diagnosis.

Treatment of tropical sprue is discussed as under:

Tropical Sprue

Diagnosis suggested by clinical history, small bowel barium study (mucosal oedema, flocculation and clumping of barium), jejunal mucosal biopsy (reveals varying degree of mucosal atrophy).

Nonpharmacological

To reduce the symptom of diarrhoea during the initial phase of treatment advise the patient to avoid fatty food and dairy products and take otherwise a balanced diet. These nutrients should be introduced gradually once the patient has been on regular pharmacological treatment.

Pharmacological

1. Tab. Norfloxacin 400 mg 2 times a day.
   Or
   Tab. Ciprofloxacin 500 mg 2 times a day.
   Or
   Cap. Doxycycline 100 mg 2 times a day.
   Or
   If the above mentioned drugs are contraindicated
   Tab. Cotrimoxazole 960 mg 2 times a day.
2. Tab. Folic acid 5 mg 2 times a day.

The above treatment is given for 3-6 months duration depending upon patient's response. Other minor nutrient supplements are given if there is evidence of specific deficiency.

Patient education

- Well balanced diet including all major & minor nutrients should be taken.
- Patient should be advised to follow general hygienic measures regarding eating habits.
- To come back for review if there is no clinical improvement in 3-4 weeks of treatment.

References

1. Disorders of Absorption. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1665-1679.

ULCERATIVE COLITIS

Salient features

- Patient may present in acute stage with bloody diarrhoea, may be associated with systemic symptoms of low to moderate fever, backache, arthralgias.

- The diagnosis is confirmed by sigmoidoscopic examination and mucosal biopsies.
- The disease almost always involves rectum and rest of the colon may be involved to variable length.
- Acute disease is graded as mild (2-4 stool/day), moderate (4-6 stools/day) or severe (> 6 stools/day). During remission patient may be asymptomatic or may have extra-intestinal symptoms.

Treatment

Aim of the treatment include induction of remission in acute stage and then maintenance of remission.

Nonpharmacological

There is no specific dietary restriction but patient may avoid any food if the patient is uncomfortable.

Pharmacological

A. Mild to moderate acute ulcerative colitis (distal/left colonic involvement)

1. Tab. Sulphasalazine 1 g 3-4 times a day.

   Or

   Tab. Mesalazine 800 mg 3-4 times a day.

   Or

   Tab. Olsalazine 1-3 g/day in divided doses.

2. Prednisolone phosphate enema, 20 mg in saline 100 ml 1-2 time a day.

   Or

   Hydrocortisone enema 100-125 mg in 100 ml saline 1-2 times a day. (to be prepared fresh)

   Or

   If disease limited to rectum, Hydrocortisone foam 125 mg 1-2 times a day.

B. Moderate to severe or extensive acute disease

1. Start (1) as above.
2. Tab. Prednisolone 20-60 mg/day in single or divided doses.

Follow up

If the symptoms do not improve or worsen, patient will need hospitalization.

C. Acute severe disease with systemic symptoms (requires hospitalization under the care of specialist)

1. Inj. Hydrocortisone 100 mg IV 4 times a day.

   Or

   Inj. Dexamethasone 4 mg IV 3-4 times a day.

2. Patient should be kept 'nil by mouth' and should be given adequate intravenous fluids and electrolytes.

3. Blood transfusion to be given as per requirement.
4. Patient switched over to oral steroids and amino-salicylates to be started as in A (1) as soon as patient is allowed to take orally.
   If patient fails to respond to steroids, refer the patient to gastroenterologist for immunosuppressive therapy or surgery.

Once the remission is induced, steroids are tapered slowly over 4-6 weeks period. For acute attack, there is no use of giving steroids for more than 12 weeks.

Follow up

Close clinical/biochemical/radiological monitoring is required for any complications like toxic megacolon/perforation.

D. Maintenance of remission

1. Any of the drug used in A(1) should be given life long.

Patient education

- Patient should be followed up at 6 monthly interval and maintenance treatment should be continued.
- In any patient who has disease for more than 10 years, a regular sigmoidoscopy and rectal biopsy should be done at 6 monthly interval to look for any dysplasia and total colonoscopic examination should be done at 2-3 year interval.
- Patient should be explained about chronic nature of the disease and continuation of maintenance treatment for life long with regular follow up and risk of colonic cancer after 10 years of onset of disease.

References

1. Irritable Bowel Syndrome. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DLet al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1679-1692.

AMOEBIC LIVER ABSCESS (ALA)

Liver abscess is the commonest extra-intestinal form of amoebiasis, caused by *E.histolytica*. In endemic areas, usually affects young individuals, more commonly chronic alcoholics. Females are only rarely affected.

Salient features

- Acute fever, right upper quadrant abdominal pain which may be dull ache or pleuritic in nature.

- It is less common in elderly and is more likely to be chronic in presentation with low abdominal pain, intermittent fever and general symptoms. Jaundice is uncommon.
- Complications include rupture of abscess into pleural, pericardial or rarely peritoneal cavity.
- Elevated blood counts/ ESR/ serum alkaline phosphatase, one or more hypoechoeic lesions in liver on ultrasonography and positive test for antibodies to *E.histolytica* in high titre help in the diagnosis. Examination of pus of the parasite is usually negative.

Treatment

Nonpharmacological

Hydrotherapy if the fever is high

Pharmacological

1. Tab. Metronidazole 800 mg 3 times a day for 7-10 days
   Or
   Tab. Tinidazole 600 mg 2 times a day for 7-10 days
2. If patient is very toxic
   Inj. Metronidazole 500mg given 8 hourly until patient improves. Switch over to oral therapy whenever possible.

Indications for aspiration of amoebic liver abscess:

1. If doubt about possibility of pyogenic abscess
2. No improvement with medical treatment in 72 hours
3. Impending rupture of abscess- one very close to the surface of liver
4. Left lobe abscess if large, to prevent rupture in to pericardium

Follow up

- Monitor the patient for resolution of symptoms with medical treatment and aspirate if any indication.
- Abscess cavity may persist for several weeks even after cure of infection. Therefore, frequent ultrasonographic examinations are un-necessary unless patient develops symptoms. May be repeated after 4-6 weeks after the patient becomes asymptomatic.
- After treatment with metronidazole, Tab. Diloxanide furoate 500 mg 3 times a day for 1 week may be given specially if patient is in non-endemic area.

Patient education

- Avoid taking alcohol while on treatment with metronidazole.
- Stress the need for adopting hygienic precautions regarding food intake to prevent enteric infections.

References

1. Amebiasis and Infection with Free Living Ameba. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1199-1203.

PYOGENIC LIVER ABSCESS

Liver abscesses constitute 48% of all visceral abscesses. Pyogenic abscesses in liver are usually caused by spread of infection from peritoneum, abdominal viscera like appendicitis/diverticulitis/portal pyemia or disease of biliary tract. It is mostly caused by coliform organisms.

Salient features

- Fever is the commonest symptom, associated with abdominal pain, toxemia, symptoms of the associated problem like appendicular pain/ mass etc. Mostly the abscesses are small and multiple.
- Diagnostic investigations include full blood counts, USG of abdomen, blood culture, examination of pus including culture, CT scan, MRI

Treatment

Nonpharmacological

- Drainage- percutaneus catheter or open surgical- remains the mainstay of treatment
- If patient is toxic, should be kept nil by mouth and given IV fluids as per requirement

Pharmacological

Initial empirical treatment should include broad-spectrum antibiotic(s)

1. Inj. Ceftriaxone 1-2g IV 2 times a day
2. Inj. Gentamicin 3mg/kg/day IV in 3 divided doses
3. If source of abscess is intra-abdominal sepsis add
   Inj. Metronidazole 500mg IV 3 times a day should be added

Follow up

- Monitor for clinical improvement and modify the therapy based n culture sensitivity report
- Abscess should always be drained
- Surgery considered if no improvement with medical treatment and percutaneus drainage in 4-7 days.

Patient education

- Avoid taking alcohol while on treatment with metronidazole.
- Stress the need for adopting hygienic precautions regarding food intake to prevent enteric infection

References

1. Intraabdominal Infections and Abscesses, In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 829-834.

ACUTE PANCREATITIS

Acute inflammation of pancreas, usually caused by alcohol or gall stone migrating through the common bile duct. Less commonly caused by trauma, infections like mumps, ascariasis and drugs like diuretic, azathioprine etc.

Salient features

- Clinically presents as acute onset constant upper abdominal pain 'penetrating through to the back', may be partially relieved by sitting with trunk flexed and knees drawn up. In severe cases, there is anorectal paralytic ileus, vomiting, abdominal distention, jaundice and fever.
- Diagnosis is made by detection of increased serum amylase, three or more times the normal, in the absence of salivary gland disease, gut perforation or infarction.
- Serum lipase elevation is more specific for pancreatitis. Ultrasonogram or CT-scan further help to confirm the diagnosis. Complications include necrosis, haemorrhage, pseudocyst, abscess, pleural effusion, and other end organ failure.

Treatment

In 85-90% case disease is self-limiting and subside spontaneously in 3-7 days.

Nonpharmacological

If no signs of hypovolemia:

- Infusion Dextran saline - 1 L
- Infusion Dextran - 1 L
- Inj. Potassium chloride (KCl) 60-80 mmol (20 mmol added to 50 ml of IV fluid)

If signs of hypovolemia: Add Haemacoel 500 ml - 1000 L.

- Nasogastric tube aspiration - if evidence of paralytic ileum, abdominal distension and vomiting.
- Send blood for complete blood count, amylase, KFT, LFT, blood sugar, serum triglycerides and arterial blood gases. Repeat these test at 48 hours, early if indicated. Oral intake start after 48-72 hours depending upon appearance of bowel sound and relief in pain.
- Fats should be avoided until acute phase settles.

Pharmacological

1. Inj. Diclofenac sodium 50 mg IM 2-3 times a day.
2. If pain is not relieved
   Inj. Tramodol 50 mg IM, repeated 6-8 hourly if needed. Patient with severe necrotizing pancreatitis (as diagnosed by contrast enhanced CT) should be managed by a specialist.

Patient education

- Avoid alcohol in patients with gall stones, avoid fatty food and explain the patient about need of early gall bladder removal.

References

1. Approach to the patient with pancreatic disease. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1788-1792.
2. Acute and Chronic Pancreatitis. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1792-1798.

CHRONIC PANCREATITIS

Usually caused by chronic alcohol consumption or possibly malnutrition in tropics.

Salient features

- Characterized by chronic diarrhoea due to malabsorption, upper abdominal pain and diabetes mellitus.
- Diagnosis confirmed by pancreatic function tests, ERCP or MR pancreatography.

Treatment

Nonpharmacological

Alcohol should be stopped. Dietary modification include use of 'coconut

oil' as the source of fat, restriction of sugars/refined carbohydrates if patient has impaired glucose tolerance.

Pharmacological

Aim is to supplement pancreatic lipase during meals (30,000 IU lipase required with each meal)

1. Cap. Pancreoflat 2 capsules to be taken during the meal and 2 capsules after the meal.
2. Cap. Omeprazole 20 mg twice a day to be taken 30 min before meals.
   Or
   Cap. Lansoprazole 30 mg twice a day.
   Or
   Tab. Pantoprazole 40 mg twice a day.
3. Tab. Diclofenac 50 mg to be taken as and when required for pain.
4. If diabetes not controlled with diet, for drug therapy (see section on diabetes mellitus).

Patient education

- Patient should be regularly followed up for appearance of any specific nutrient deficiency, especially deficiency of fat soluble vitamins and adequate supplements should be given if required.
- Patient should be explained about giving up alcohol consumption and may require behavioural therapy.

References

1. Acute and chronic pancreatitis. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1792-1804.

GASTROINTESTINAL (GI) BLEEDING

Gastrointestinal (GI) bleed may present as occult or overt bleed. Upper GI bleed is defined as bleeding from any site from pharynx to duodenojejunal (DJ) flexure or more specifically upto ligament of Trietz and usually presents as haemaetemesis or melena (black, tarry, sticky, foul smelling stools). Bleeding from GIT distal to DJ flexure is called lower GI bleed. Presence of identifiable fresh/altered blood in stool is called haematochezia. Minimum of 60 ml of blood is required in the stomach to produce melena. Black stools may be seen in patients taking iron, charcoal or bismuth salts.

Salient features

- Occult or overt bleed or fresh blood.
- For diagnosis of GI bleed need clinical history, examination and radiological/endoscopic examination.
- Active bleed is indicated by presence of fresh blood in vomitus, nasogastric tube aspirate, melena, passage of fresh blood in stool.

Treatment

Acute GI bleed is an emergency and needs active management. An assessment of activity and severity of bleed should be done immediately.

Nonpharmacological

- Maintain vital signs (blood pressure, airways, respiration, temperature).
- Insert a large bore IV cannula and send the blood samples for Hb, TLC, platelets, coagulation profile, renal and liver function tests, blood grouping and cross-matching.
- Start IV fluids like normal saline/ Ringer's lactate/ haemacoel.
- Severity of GI bleed is assessed as mild (patient has tachycardia but blood pressure is maintained), moderate (tachycardia with postural hypotension, tachypnoea, sweating, cold skin) and severe (hypotension and shock)
- Replace the blood as soon as available if moderate to severe bleed or active bleed.

Pharmacological

1. Inj. Ranitidine 300 mg IV infusion/24 hours started if non-variceal upper GI bleed suspected (patient with known peptic ulcer or reflux disease, taking NSAIDs)
2. If variceal bleed is suspected (chronic alcoholic, jaundice, splenomegaly, dilated abdominal veins, ascites, encephalopathy)
   Inj. Octreotide 50 mcg IV immediately followed by 25 mcg/hour infusion
   Or
   Inj. Terlipressin 1-2 mg IV given 4-6 hourly.
   Or
   Inj. Vasopressin 20 IU in 200 ml of normal saline over 20 min. Maintenance dose is given as 100 units in 50 ml of 5% dextrose given as 0.2-0.9 units/min (6-27 ml/h) in the next 24 hours. Avoid in ischaaemic heart disease (IHD). Nitroglycerine drip can also be used along with this if systolic BP is >90 mmHg.

Follow up

Monitor pulse, blood pressure and urine output and activity of bleed.

Presence of identifiable blood/clots per rectum in a patient with upper GI bleed indicates a severe ongoing bleed and need for very active management.

Transfer patient urgently (after starting the above treatment) to a higher center for further investigations and treatment if uncontrolled bleed, severe bleed, poor urine output and shock.

References

1. Gastrointestinal Bleeding. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 252-254.
2. Gastrointestinal Bleeding. In: Emerg Med Clin North Am, Talbot-Steer JK et al (eds), 1996, 14, pp 173-184.

7

BACTERIAL INFECTIONS

TYPHOID (ENTERIC FEVER)

It is caused by *Salmonella typhi* and *paratyphi.*

Salient features

- Continuous fever (temperature upto 40°C), may be associated with headache, malaise, abdominal discomfort, constipation or diarrhoea (pea-soup stool).
- Complications usually occur in the 3rd week and may include lower GI bleed, intestinal perforation, disseminated intravascular coagulation and jaundice.
- Examination may reveal a toxic look with relative bradycardia and mild soft splenomegaly. Diagnosis is suggested by rising titres of 'O' antibodies (Widal Test) and confirmed by isolation of organism in blood, bone-marrow, urine or stool.

Treatment

Nonpharmacological

Cold sponging, rest and normal diet.

Pharmacological

1. Tab. Paracetamol 500-1000 mg 6 to 8 hourly to reduce headache and fever (for details see section on fever).
2. Tab. Ciprofloxacin 10 mg/kg in 2 divided doses, upto a maximum of 750 mg twice a day for 10-14 days (for 1 week after the fever subsides).

   Or

   Inj. Ciprofloxacin 200 mg IV twice a day (initial treatment in severely ill hospitalized patient).

   If no response after 5 days,

   Inj. Ceftriaxone 50-60 mg/kg per day IV or IM in 2 divided doses or as a single dose for 7-10 days (preferred in pregnant women patients, children or patients resistant to quinolones).

Or

Inj. Cefixime 20 mg/kg per day in 2 divided doses for 14 days. If there is no response after 5 days, alternative diagnosis should be considered.

Report to the physician immediately if abdominal symptoms worsen or occurrence of bleeding per rectum or alteration in sensorium and shock (severe typhoid with high risk of fatality).

3. Severe typhoid with shock or patients with enteric encephalopathy should be hospitalized and treated as above plus
   Inj. Dexamethasone 3 mg/kg IV first dose followed by 1 mg/kg IV every 6 hourly for 8 doses.

Chronic Carrier State (patients who continue to excrete bacilli in stool for more than 1 year).
Tab. Ciprofloxacin 750 mg twice a day for 28 days.

Patient education

- Small frequent feeds should continue. Give plenty of oral fluids and compensate for increased fluid loss from the body due to high grade fever.
- Fever usually lasts 5-7 days even after starting effective treatment in most cases. Frequent change of therapy should therefore be avoided.
- The treatment should be completed till the patient has been afebrile for at least 7 days as incomplete treatment increases the risk of relapse and emergence of resistance.
- Three types of vaccines are available to prevent this disease. (see section on immunization for details).

References

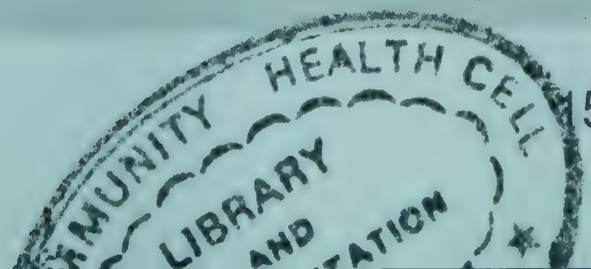
1. Salmonellosis. In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., pp 970-975.

TETANUS

An acute neurological disorder resulting from contamination of a wound (may be a trivial one) by an obligate anaerobic organism, *Clostridium tetani.*

Salient features

- Generalized tetanus, the most common form usually starts with trismus or lockjaw followed by rigidity, violent, painful, generalized



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muscle spasms and seizures provoked by slightest stimulation. Generalized muscle spasms may compromise respiration. Fever and tachycardia may be present. Mentation is not impaired.

- Prognosis and management depends on grade.

Grade I or Mild - muscle rigidity with few or no spasms.
Grade II or Moderate - trismus, dysphagia, rigidity, and short-lasting spasms.
Grade III or Severe - frequent explosive spasms, autonomic dysfunction particularly sympathetic over-activity may be present.
Grade IV or very severe -features of grade III plus violent autonomic disturbances involving the CVS – severe hypo or hypertension.

- Other presentations include local, cephalic (cranial nerves) or neonatal tetanus (within 2 weeks of life).
- Complications include respiratory failure, respiratory infections, barometric trauma due to prolonged ventilator support, persistent hypotension, labile hypertension, cardiac arrhythmia, sepsis and sudden death.

Treatment

Nonpharmacological

Admit in a quiet room/ICU with minimum stimulation, cardiopulmonary monitoring, protection of airways/respiratory support (intubation/ tracheostomy) with or without ventilation, cleaning/exploration/ debridement of wound.

Maintain hydration and enteral/parenteral nutrition with high calorie and high protein diet.

Pharmacological

Grade I tetanus

1. As above.
2. Tab. Diazepam 5-20 mg 3 times a day in mild tetanus; slow IV infusion in moderate to severe tetanus. Not to exceed a dose of 80-100 mg in 24 hours.

If spasms not controlled.

Inj. Phenobarbitone 200 mg IM every 8-12 hours.

Or

Inj. Chlorpromazine 50 mg IM in adults 4 times a day.

The ideal sedative and muscle relaxant schedule for each patient should be individualized. An objective guide to decrease in rigidity is relaxation of abdominal muscles.

Grade II

1. As above.
2. Tracheostomy.

Grade III and IV

1. As above.
2. Ventilator support.
3. Inj. Pancuronium 2-4 mg IV.

   Or

   Inj. Gallamine 20-40 mg IV.
4. In case of hypotension

   Inj. Dopamine/Dobutamine 10-40 mcg/kg/min infusion titrated to maintain systolic BP of 100 mm Hg.

If bradyarrhythmias Inj. Atropine 0.6-1.2 mg IV.

If hypertension (for details see section on hypertension)

In addition give following to all the patients

Inj. Crystalline penicillin 2 mega units 6 hourly IV for 10 days.

Or

Inj. Metronidazole 500 mg 8 hourly or 1 g 12 hourly.

(Other antibiotics may be required according to need of infected wound).

Inj. Human tetanus immunoglobulin (TIG) 3000-5000 units IV or IM.

Or

Inj. Equine antiserum, 10,000 units by slow IV Injection after sensitivity test (If human TIG is not available).

Antiserum should be given before local manipulation of the wound.

(CAUTION: Tetanus immunoglobulin does not produce natural immunity and a full course of immunization with tetanus toxoid should be administered once the patient has recovered).

References

1. Tetanus. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., pp. 918-20.
2. Tetanus. In:Oxford Textbook of Medicine, Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 624-30.

OPPORTUNISTIC INFECTIONS

Opportunistic infections are those caused by organisms that do not ordinarily harm healthy people but occur in people with impaired defenses (immuno-compromised hosts). Broadly, immuno-compromised hosts are categorized into three categories:

i) Primary immunodeficiency syndromes, mostly congenital.

ii) Secondary immunodeficiency syndromes e.g. AIDS, haematological

malignancies, splenectomy etc.
iii) Therapeutic immunosuppression.

Salient features

The type of immunosuppression may give clue to the likely pathogens to produce opportunistic infections e.g.

- Neutropenia predisposes an individual to bacteriaemia particularly with gram-negative organisms, *Staphylococcus* and *Candida albicans*.
- Immunosuppression due to corticosteroids predisposes to infections with *M. tuberculosis* & fungi e.g. *Candida, Cryptococcus*.
- HIV/AIDS predisposes to infections with mycobacteria, fungi, cytomegalo virus, *Pneumocystis carinii*, protozoal infections like toxoplasma and many more organisms.
- The duration of immunosuppression and speed of progression of immunosuppression also determines the likely pathogen. In splenectomized patients, capsulated bacteria are the likely pathogens.
- The diagnosis of specific infection is made by appropriate investigation, choice depending upon the clinical suspicion and the type of immunosuppression.

Treatment

Nonpharmacological

General hygienic measures for prevention of infection, barrier nursing for neutropenic patient.

Pharmacological (Specific treatment of opportunistic pathogens)

Candidiasis

Vulvovaginal candidiasis

Tab. Fluconazole 150 mg single dose.

Oral thrush

Clotrimazole oral troches five times a day till infection clears.

Oesophageal

Tab. Fluconazole 200 mg on first day followed by 100 mg daily for 7-14 days.

Or

Nystatin Susp. 100,000 units/ml, 10-20 ml 6 hourly for 15 days.

If it fails, Tab. Itraconazole 100-200 mg once daily for 15 days.

Recurrent oropharyngeal candidiasis in HIV positive patients – treat for each individual episode.

In resistant cases Amphotericin lozenges are used for 7-10 days followed by Nystatin or Fluconazole for as long as the host resistance remains low (in AIDS patients).

Disseminated infection

Inj. Amphotericin B IV 0.5-0.7 mg/kg/day for 2 weeks after the patient becomes afebrile.

Pneumocystis Pneumonia

Tab. Trimethoprim + Sulfamethoxazole (TMP-SMZ) 15-20 mg TMP + 75-100 mg SMZ/kg/day in 3-4 divided doses for 14 days in non-HIV patients and 21 days in HIV positive patients.

Or

Tab. TMP 15 mg/kg/day orally + Tab. Dapsone 100 mg/day for mild cases of PCP.

Or

Inj. Pentamidine 4 mg/kg/day slow IV infusion as a single dose.

In HIV positive patients with severe PCP i.e. Arterial pO_2 of 70 mmHg or less, Alveolar arterial pO_2 difference of 35 mmHg or more.

Steroids are recommended as adjunct therapy:

Tab. Prednisolone 40 mg 2 times a day for 1-5 days; 40 mg once daily on days 6-10 and 20 mg once daily on days 11-20.

Cryptococcosis (In patients with AIDS)

Inj. Amphotericin B 0.7 mg/kg/day for a minimum 2 weeks or till condition is stable, followed by Tab. Fluconazole 400 mg/day till infection is controlled, followed by Tab. Fluconazole 200 mg day indefinitely.

Cryptococcosis (In patients without AIDS)

Inj. Amphotericin B, doses as above till cultures from all positive sites become negative, with a maximum of 10 weeks.

References

1. Infection in the Immuno-compromised Host. In: Oxford Textbook of Medicine, Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 1027-35.
2. Diagnosis and Treatment of Fungal infections. In: Harrison's Principles of Internal Medicine, Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., pp 1168-70.
3. Pneumocystis carini Infection. In: Harrison's Principles of Internal Medicine, Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., pp 1168-70.

8

PARASITIC INFECTIONS

Intestinal Protozoal Infections

Amoebiasis and giardiasis are the commonest intestinal protozoal infections. Patients of amoebiasis and giardiasis commonly present as asymptomatic carriers.

AMOEBIASIS (INTESTINAL)

Infection is caused by intestinal protozoa-*Entamoeba histolytica.* Infection usually spreads by infective cysts in stool which contaminate food and drinking water.

Salient features

- Lower abdominal pain, mild diarrhoea develop gradually and may lead to full blown dysentery.
- 10-12 stools per day with blood and mucus and little fecal matter.
- Cecal involvement may mimic acute appendicitis.
- Chronic form i.e. amoebic colitis, can be confused with inflammatory bowel disease. Other form of chronicity may present as amoeboma.
- Untreated or incompletely treated intestinal infection may result in amoebic liver abscess and involvement of other extra intestinal site.
- Diagnosis made by demonstration of cysts and/ or trophozoites of Entamoeba histolytica in the stool.

Treatment (Asymptomatic cyst passers)

Tab. Diloxanide furoate 500 mg 8 hourly for 10 days.

Treatment (Acute amoebic dysentery and chronic infections)

1. Tab. Metronidazole 500 mg 8 hourly PO or IV for 10 days.
   In children 15 mg/kg divided in three doses for 7 days.
   Or
   Tab. Tinidazole (300 mg, 500 mg and 1 g) 2 g orally as single dose

In children 50 mg/kg as a single dose.

2. Tab. Diloxanide furoate 500 mg 8 hourly for 10 days.
In children 20 mg/kg/day in three divided doses for 10 days.
For treatment of amocbic Liver abscess (see chapter on gastro intestinal diseases)

GIARDIASIS

ntestinal disease caused by protozoal parasite – *Giardia lamblia.* The disease spreads by direct faeco-oral transmission.

Salient features

- **Acute giardiasis** – Although diarrhoea is common, upper intestinal manifestations like abdominal pain, bloating, belching, flatus, nausea and vomiting may predominate.
- **Chronic giardiasis** –History of one or more episodes of acute diarrhoea, increased flatus, loose stools, abdominal distension, borborygmi, eructation of foul tasting gas and passage of foul smelling flatus, and weight loss. Symptoms could be intermittent, recurring and gradually debilitating; Severe disease may result in malabsorption, weight loss, growth retardation and dehydration.
- Diagnosis is made by the demonstration of cysts and or trophozoites of *G. lamblia* in the stools.

Treatment

Tab. Tinidazole 2 g as a single dose in adults.
n children 50 mg/kg as a single dose.

Or

Tab. Metronidazole 400 mg every 8 hours for 7 days in adults.
n children 15 mg/kg divided in three doses for 7 days.

Patients education

These infections spread by ingestion of food or water contaminated with cysts.
Properly cooked food, use of clean drinking water, proper sanitation and good personal hygiene- hand washing with soap after defecation and before meals may prevent infection.
Infection can be minimized by avoiding unpeeled fruits and vegetables
Side effects are usually mild and transient and include nausea, vomiting, abdominal discomfort, metallic taste and a disulfiram like reaction, therefore, avoid use of alcohol during treatment.

References

1. Infectious Diseases: Protozoal and Helminthic. In: Current Medical Diagnosis and Treatment. Lawrence M Turney Jr, Stephen J McPhee, Maxine A Papadakis (eds), 38th Edition, 1999, Prentice Hall International Inc. USA, pp 1353- 1417.
2. Drugs Used in the Chemotherapy of Helminthiasis. In: The Pharmacological Basis of Therapeutics. Martin J. Wonsiewicz and Peter MC Curdy (eds), 9th Edition, 1996, McGraw Hill Company Inc., USA, pp 1009- 1026.
3. Drugs used in the Chemotherapy of Protozoal Infections Trypanosomiasis, Leishmaniasis, Amebiasis, Giardiasis, Trichomoniasis and other Protozoal Infections . In: The Pharmacological Basis of Therapeutics. Martin J. Wonsiewicz and Peter MC Curdy (eds), 9th Edition, 1996, McGraw Hill Company Inc., USA, pp 987- 1008.
4. Diseases due to Infection. In: Davidson's Principles and Practice of Medicine. Haslett C, Chilvers ER, Hunter JAA et al (eds), 18th Edition, 1999, Harcourt Brace and Company Limited., UK, pp 57-190.

WORM INFESTATIONS

The majority of worm infestations are asymptomatic.

HOOK WORM INFESTATION

Infection is caused by *A. duodenale* and *N. americanus*. The infective larvae penetrate through skin usually foot and travels through subcutaneous tissue to the intestines. The adult forms live in the jejunum and feed on blood thus, leading to chronic blood loss and anaemia.

Salient features

- Most of the affected individuals may be asymptomatic. Patients usually present with symptoms of anaemia (hypochromic microcytic).
- Pruritic maculopapular dermatitis (ground itch) at the site of skin penetration by infective larvae.
- Serpigenous tracts of subcutaneous migration in previously sensitized hosts.
- Mild transient pneumonitis because of larvae migration through lungs
- Intestinal manifestations - epigastric pain often with post prandial accentuation, inflammatory diarrhoea.
- Major consequences – Progressive iron deficiency anaemia and hypoproteinemia leading to weakness, shortness of breath and skin depigmentation.
- The condition is diagnosed by the demonstration of ova of *A. duodenale* and or *N. americanus* in the stool and occult blood.

Treatment

Tab. Mebendazole 100 mg 12 hourly for 3 days in children above 2 years of age.

(**CAUTION:** Contraindicated in children less than 2 years)

Or

Tab. Pyrantel Pamoate (250 mg); Syp. (250 mg/5 ml) 10 mg/kg body weight once daily for 3 days.

(**CAUTION:** Not recommended in children below one year of age)

In children more than 1 year Susp Pyrantal pamoate 10 mg/kg as a single dose.

Or

Tab. Albendazole 400 mg as a single dose.

In children between 1-2 years of age Syp. Albendazole 200 mg as a single dose: In children more than 2 years Syp. Albendazole 400 mg as a single dose

For treatment of anaemia (see section on anaemia) and nutritional support.

Patient education

- Hookworm infestation occurs through skin penetration by the infective larvae.
- The disease can be prevented by use of boots and gloves while working in the fields.
- The deworming agents should not be used in pregnancy, lactation and along with alcohol.
- Side effects of these drugs are generally mild which may include nausea, abdominal pain, headache, dizziness, malaise and skin rash.

ASCARIASIS (ROUND WORM INFESTATION)

Ascariasis is caused by *Ascaris lumbricoides*, the largest intestinal nematode parasite of humans reaching up to 40 cm in length. The worm is usually located in the small intestine.

Salient features

- Most infected individuals have low worm burden and are asymptomatic
- Features of pulmonary involvement because of larval migration include irritating nonproductive cough, bronchospasm or pneumonitis and burning substernal discomfort aggravated by

coughing or deep inspiration, dyspnoea, fever, eosinophilic pneumonitis.

- Heavy intestinal infection- Pain abdomen, small bowel obstruction which may get complicated by perforation, intussusception or volvulus. Aberrant migration of a large worm may cause biliary colic, cholangitis, cholecystitis, pancreatitis and oral expulsion of the worm.

Treatment

Tab. Mebendazole 100 mg 12 hourly for 3 days.
(**CAUTION:** Contraindicated in children less than 2 years)

Or

Tab. Piperazine (Adults) 4 g once daily for 2 days; Syrup (750 mg/5 ml) 75 mg/kg once daily for 2 days.

Or

Tab. Pyrantel pamoate 11 mg/kg as a single dose.

Or

Tab. Albendazole 400 mg as a single dose. In heavy infestation, however, a 2-3 day course is indicated.
(CAUTION: Contraindicated in pregnancy)
In children between 1-2 years: Albendazole Susp (200 mg/5 ml) 200 mg as a single dose; in children more than 2 years Syp./Tab. Albendazole 400 mg as a single dose.
Partial intestinal obstruction may be managed with nasogastric suction, IV fluid administration and instillation of piperazine through nasogastric tube. Complete obstruction and other surgical complications require surgical referral for intervention.

Patient education

- Infection occurs mainly via faecally contaminated soil and via eggs borne on vegetables and food.
- Proper sanitation and good personal hygiene- hand washing with soap after defecation and before meals may prevent infection.
- Infection can be minimized by avoiding unpeeled fruits and vegetables and use of clean drinking water.

ENTEROBIASIS

Infection is caused by *Enterobius vermicularis* (Pin worm). Adult pinworm is around 1 cm long and dwells in the bowel lumen in the small and large intestine around caecum area.

Salient Features

- Most pinworm infestations are asymptomatic.
- Cardinal symptoms are perianal pruritis because of deposition of eggs in the perianal area, worse at night due to migration of female worms. Excessive itching can lead to perianal excoriation and bacterial superinfection. Sometimes also associated with enuresis in children.
- Heavy infection causes abdominal pain and weight loss.
- Rarely, in females vulvovaginitis and pelvic or peritoneal granulomas occur.
- Eosinophilia.
- Diagnosis is made by demonstration of the ova of *Enterobius vermicularis* in perianal swabs or a cellophane tape should be pressed against perianal skin. In the morning, when the child gets up, eggs stick to the tape and can be examined under the microscope.

Treatment

Tab. Mebendazole 100 mg as a single dose in adults and children more than 2 years of age.
(Contraindicated in pregnancy and in children below one year of age).

Or

Tab. Pyrantel pamoate 11 mg/kg body weight as a single dose.

Or

Tab. Albendazole 400 mg as a single dose.
Children (1-2 years) Syp. Albendazole 200 mg as a single dose; More than 2 years 400 mg as a single dose.
Repeat treatment after two weeks.

Assessment of response of worm infestation to therapy

- Clinical improvement.
- Repeat stool, perianal swab examination for ova of Enterobius vermicularis.
- Absolute eosinophil count, haemoglobin and peripheral blood smear examination at monthly intervals for 3-6 months.
- Serum albumin level in hook worm infection.

Patient education

- Treatment of all family members is required to eliminate asymptomatic reservoirs of potential reinfection.
- Proper sanitation and good personal hygiene, hand washing with soap after defecation and before meals may prevent infection.

- Infection can be minimized by avoidance of unpeeled fruits and vegetables and use of clean drinking water.
- Regular washing and disinfection of linen.

References

1. Infectious Diseases: Protozoal and Helminthic. In: Current Medical Diagnosis and Treatment. Lawrence M Turney Jr, Stephen J McPhee, Maxine A Papadakis (eds), 38th Edition, 1999, Prentice Hall International Inc. USA, pp 1353- 1417.
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4. Diseases due to Infection. In: Davidson's Principles and Practice of Medicine. Haslett C, Chilvers ER, Hunter JAA et al (eds), 18th Edition, 1999, Harcourt Brace and Company Limited., UK, pp 57-190.

KALA-AZAR

Also called visceral Leishmaniasis, caused by *Leishmania donovani*, a protozoan transmitted mostly through bite of sandfly. Endemic in areas of Bihar and Eastern Uttar Pradesh.

Salient features

- Fever, abdominal discomfort due to a large spleen, weight loss, malaise and general debility.
- ***Physical signs*** usually depend upon the duration of disease. Early cases may present with asymptomatic splenomegaly. Late cases are generally wasted, febrile and show hyperpigmentation of face, hands and feet.
- Spleen is generally massively enlarged. Liver is usually moderately enlarged and lymphadenopathy may be present.
- Complications include extreme wasting and intercurrent infections. Untreated, 80-90% of patients die.

Diagnosis is suggested by clinical features, presence of pancytopenia, hypergammaglobulinemia and hypoalbuminemia and confirmed by demonstration of LD bodies in the bone marrow/splenic aspirate. Serological tests (ELISA) are useful for field diagnosis.

Treatment

Blood transfusion.

Nonpharmacological

Cold sponging, rest and high protein diet.

Pharmacological

Nonspecific

1. Tab. Paracetamol 500-1000 mg 6-8 hourly to reduce fever.
2. Treatment of intercurrent infections.

Specific

Inj. Sodium Stibogluconate 200 mg test dose followed by 20 mg/kg IM/slow IV injection for 28 days. IM injection is painful thus IV route is preferred although cough is the common side effect specially when the volume is high, as is the case for most adults.

Or

Inj. Amphotericin B 0.5–1 mg/kg/day with a total of 15-20 mg/kg. Drug of choice in patients resistant to or intolerant to Sodium Stilbogluconate.

Other drugs that have been found useful are

Inj. Pentamidine isethionate 4 mg/kg/day x 15-30 days.

Or

Inj. Aminosidine (Aminoglycoside) 15 mg/kg/day x 21 days per-orally particularly in HIV positive patients.

Clinically, patient feels better and becomes afebrile during the first week of treatment. Return of pancytopenia, abnormal liver function, serum albumin, splenomegaly and weight gain may take weeks or months to improve.

Reassessment at 6 weeks and 6 months will usually detect any relapse. Patient is said to be cured if no clinical relapse occurs during the first 6 months of follow-up. There is no need to prove absence of parasite as a marker for cure.

Treatment of relapse

Inj. Sodium Stibogluconate 20 mg/kg/day for at least 8 weeks with frequent monitoring for parasite count.

Or

Inj. Amphotericin B in doses mentioned above.

Or

Liposomal Amphotericin B 2-5 mg/kg/day IV on days 1-5,14 and 21 for a total of 21 mg/kg.

Special situations

Patients co-infected with HIV respond slowly, require longer treatment and are more liable to relapse.

Monitoring for drug side-effects.

- Sodium Stibogluconate: Patient may have myalgia, arthralgia, fatigue, elevated transaminases, chemical pancreatitis and ECG abnormalities in the form of increased QTc interval or concave ST segment may occur. LFT need to be monitored regularly.
- Pentamidine can cause nephrotoxicity and diabetes.
- Amphotericin B can cause nephrotoxicity, therefore, monitor for nephrotoxicity.

References

1. Leishmaniasis. In: Harrison's Principles of Internal Medicine. Braunwald E, Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., pp 1213-17.
2. Leismaniasis. In: Oxford Textbook of Medicine. Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 899-907.

9

CENTRAL NERVOUS SYSTEM

MIGRAINE

Benign and recurring syndrome of headache, nausea, vomiting and other neurological symptoms in various admixtures.

Salient features

- At least 5 attacks fulfilling following criteria: unilateral, pulsating, aggravated by routine activity lasted for 4-72 hours (untreated) associated with at least either nausea/vomiting or photophobia/ phonophobia with no other neurological disorders.
- Migraine also may be preceded by a focal neurological phenomena called "aura" most commonly experienced as a visual alteration, but it may involve sensory and/motor changes.
- May be mild (nondescript-tight band like discomfort often involving the entire head) or severe throbbing headache associated with vomiting, scalp tenderness with or without other neurological features.

Treatment

Nonpharmacological

Identify and avoid trigger factors such as alcohol, foods (chocolate, cheese), irregular sleep patterns and stress levels and also assess menstrual cycle relationships in female patients.

Pharmacological

A staged approach to migraine pharmacotherapy.

In case of mild migraine i.e. occasional throbbing headaches, no major impairment of functioning.

1. Tab. Aspirin 650 mg stat; if required can be repeated after 4 hours.

   Or

   Tab. Ibuprofen 400-800 mg stat; if required can be repeated after 6 hours; maximum 3 times/day.

Or

Tab. Paracetamol 1000 mg stat; if required can be repeated after 4 hours.

Or

Tab. Indomethacin 50 mg stat; If required can be administered 3 times a day.

2. If associated nausea and vomiting
   Tab. Metoclopramide 10 mg stat.

In case of moderate to severe headache i.e., three severe headaches a month with significant impairment of functioning and marked nausea or vomiting.

Tab. Ergotamine 2 mg sublingual at onset and after half an hour (maximum 6/day, 10/week).

Or

Tab. Ergotamine (1 mg) + Caffeine (100 mg). 1/2 tab at onset, then 1 tab half hourly (maximum 6/day, 10/week).

Or

Tab. Ergotamine (2 mg) + Caffeine (100 mg) suppository; I suppository at onset (max 6/day, 10/week).

(A subnauseating dose should be determined preferably during headache free period).

Or

Tab. Sumatriptan 25 – 100 mg orally at onset.

Or

Inj. Sumatriptan 6 mg SC at onset (may repeat once in 24 hours) (Contraindicated in ischaemic heart disease and hypertension).

Refer patient with severe migraine to hospital if attack is not controlled by above and if the patient is dehydrated. Also consider prophylactic medications.

Hospital management of acute migraine

1. Inj. Metoclopramide 10 mg IV.
2. Inj. Sumatriptan 6 mg SC (may repeat once in 24 hours).
   (**CAUTION:**Contraindicated in ischaemic heart disease and hypertension).

Or

Inj. Prochlorperazine 10 mg in 25-50 ml saline slow push over 2 minutes can be given twice or thrice a day.

Or

Inj. Chlorpromazine 7.5–20 mg in 25-50 ml saline slow push over 2 minutes can be given twice or thrice a day.

(Monitor carefully for orthostatic hypotension. Administer IV

diphenhydramine if acute dystonic reaction occurs).

3. In severe headache unresponsive to other drugs, Inj. Pethidine 50-100 mg IM as a single dose.

Prophylaxis

Consider prophylactic treatment if number of attacks is more than 3 per month or each attack is very severe necessitating loss of work time.

Treatment

In addition to the above nonpharmacological treatment and pharmacological treatment of the acute episode, consider

Tab. Atenolol 80-320 mg daily.

Or

Tab. Metoprolol 100-450 mg daily.

Or

Tab. Propranolol 80-320 mg daily.

Or

Tab. Amitriptyline 10-50 mg at bed time.

Or

Tab. Cyproheptadine 4-16 mg daily.

Continue treatment for 6-12 weeks before considering it ineffective. If found to be effective it should be continued for at least 6 months and then slowly tapered to assess its continued need. If headache recurs after discontinuation of prophylactic therapy, the medication regime should be reinstated for another 6 months trial.

Patient education

- Avoid precipitating factors like lack of sleep, glare, anxiety, hunger, foods like processed cheese, banana, chocolates, wine etc.
- Avoid overdose or frequent use of ergot preparation as these can cause hypertension and precipitate vascular disease.
- Drug for acute migraine should be taken as early as possible at the onset.

References

1. Headache Classification Committee of the International Headache Society. Classification and Diagnostic Criteria for Headache Disorders, Cranial Neuralgias and Facial Pain. Cephalalgia 1988; 8 (Suppl 7): 1-96.
2. The Trigeminovascular System in Humans. In: Pathophysiologic Implications for Primary Headache Syndromes of the Neural Influences on the Cerebral Circulation. [Review]. J Cereb Blood Flow Metab 1999; 19: 115-127.
3. Headache, including Migraine and Cluster Headache. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 70-79.

NEUROCYSTICERCOSIS

This is the disease produced by invasion of the CNS by the cystic stage (cysticercus) of pork-tapeworm (*Taenia solium*). Human beings acquire the disease when they ingest the food or water contaminated with the eggs of *T. solium*.

Salient features

- The clinical features depend upon site and number of cysts in the CNS, and the inflammatory response of the CNS. It can remain silent or present most commonly with seizures, encephalitis, meningitis, hydrocephalus, or increased intracranial pressure.
- Neurologic, cognitive or personality disorder in the form of decreased visual acuity may be seen in ocular cysticercosis.
- In spinal neurocysticercosis, cord compression, nerve root pain, transverse myelitis, or meningitis.

Treatment

The aim of therapy is to control symptoms i.e. convulsions and hydrocephalus.

Pharmacological

Antiepileptic drugs (for control of seizure see epilepsy section). If there is no calcification and the patient is free of seizures for 2 years, treatment can be gradually discontinued.

Antiparasitic drugs are not uniformly recommended because of risk of exacerbation of inflammatory response around the dying parasite which may worsen seizure activity or hydrocephalus. If treatment with antiparasitic drug is planned, patient should be referred to a hospital (to a physician or neurologist) for supervised treatment with following:

(**CAUTION:** Absolute contraindications are ocular cyst, or spinal medullary cyst).

Tab. Albendazole 15 mg/kg/day in 2-3 doses per day for 15 days, taken with fatty meals.

Or

Tab. Praziquantel 50 mg/kg/day in 3 divided doses for 15 days.

Surgical treatment is indicated in case of ocular cysticercosis, ventricular cyst or hydrocephalus.

Patient education

- Prolonged freezing or thorough cooking of pork to kill the parasite.
- Personal hygiene and thorough washing and avoiding unpeeled fruits and vegetables in areas endemic for *T. solium* helps prevent ingestion of eggs.
- All members of a family of an index case of cysticercosis should be examined for the presence of eggs or signs of disease.

References

1. Cestodiasis. In: Nelson Textbook of Paediatrics, 15th Edition, pp 993-995.
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5. Dexamethasone with Albendazole. In: J. of Neurol., Vol. 237, 1990, pp 279-280.
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BACTERIAL MENINGITIS

The three main pathogens, *Haemophilus influenzae*, *Streptococcus pneumoniae*, and *Neisseria meningitis*, account for 75–80% of cases after the neonatal period. There has been a worldwide increase in infection with strains of *S. pneumoniae* resistant to penicillin and other beta-lactam antibiotics (second- and third-generation cephalosporins).

Salient features

- Fever with prominent headache, neck stiffness, photophobia, and altered mental status.
- Infants, the elderly, and immunocompromised patients may show only mild behavioral changes with low-grade fever and little clinical evidence of meningeal inflammation.
- Approximately 15% of all patients, and 40% of older patients, demonstrate focal cerebral findings, and 20–50% of patients develop seizures at some time during the course.

Diagnosis

Blood cultures, urgent lumbar puncture (LP) immediately except in case with focal findings or clinical evidence of raised intracranial pressure (ICP),

cranial computed tomography (CT) before LP.

CSF examination reveals elevated pressure (200–500 mm H_2O) and protein (100–500 mg/dl, normal 15–45 mg/dl), decreased glucose (<40% serum glucose), and marked pleocytosis (100–10,000 white blood cells [WBC]/µl, normal <5) with 60% or greater polymorphonuclear leukocytes.

The CSF Gram's stain result is positive in at least 60% of cases, and CSF culture results are positive in approximately 75%. The likelihood of finding Gram's stain or culture-positive CSF may decrease 5–40% if antibiotics were administered before doing LP. Early in disease, 10–20% of patients have CSF cell counts less than 1,000 cells/µl. Otherwise, cell counts below 1,000 cells/µl in a patient with a compatible clinical syndrome indicate partially treated meningitis, concurrent immunosuppression, or a nonbacterial cause. Petechial or purpuric rash suggests *N. meningitis*, or, less often, *Staphylococcus aureus*, *pneumococcus*, or the *rickettsiae*.

Treatment

Nonpharmacological

- Hospitalize in a quiet place with no bright lights.
- Maintain the vitals, endotracheal intubation in patient with poor respiratory effort.
- Elevation of head to 30 degree.
- Hyperventilation.

Pharmacological

Empiric antimicrobial to be initiated based on the patients age and underlying disease status once a bacterial pathogen is isolated, antimicrobial therapy can be modified for optimal treatment.

1. Inj. Ceftriaxone 4 g/day in 2 doses administered every 12 hours. It can also be administered as a single dose.

   Or

   Inj. Cefotaxime 8-12 g/day, in divided doses administered every 4 hours.

   If age is more than 50 years to cover *Listeria monocytogenes* and *Pseudomonas* or in immunocompromised patients.

   Inj. Ceftazidime 8 g/day in divided doses administered every 6 hours plus

   Inj. Ampicillin 10-12 g/day in divided doses every 4 hours.
2. In case of head trauma, CSF rhinorrhoea, intracranial shunt or history of neurosurgical intervention. Also when highly penicilline or cephalosporin resistant strains of *Streptococcus pneumoniae* are suspected

   Inj. Vancomycin 500 mg IV 6 hourly.

3. In *H. influenzae* type-B meningitis, pneumococcal meningitis in children and in children over 2 month of age with neurological sequalae
   Inj. Dexamethasone 0.15 mg/kg every 6 hour IV for 2 days. It should be started at the same time or shortly before, the first dose of antibiotic. (see also meningoencephalitis in paediatric section)
4. In patient with papilloedema, altered sensorium, 6th nerve palsy, convulsions or decerbate posturing
   Inj. Mannitol 20% 1 g/kg stat followed by 0.5 g/kg every 4-6 hours.

   Continue treatment for 10-14 days with antibiotics. Clinical response is observed within 24-48 hours. Repeat lumbar puncture after 48 hours especially if on dexamethasone.

Patient education

- Explain to the relative that in unconscious patient nothing should be administered orally until patient recovers his level of consciousness.

References

1. Bacterial Infections. In: Neurology In Clinical Practice. WG Bradley, RB Daroff, GM Fenichel et al (eds), 1996, Boston: Butterworth–Heinemann, pp 1181–1243.
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ENCEPHALITIS

Herpes Simplex Encephalitis (HSE) is the most common cause of fatal sporadic acute encephalitis having a mortality of 70-80% and leaves many survivors severally disabled. Without any significant predilection for age, sex, race or season.

Salient features

- The clinical hallmark of the HSE is acute/subacute onset of fever, headache, altered consciousness and focal neurologic symptoms/signs, especially personality changes suggestive of temporal lobe involvement.
- CSF shows mononuclear pleocytosis (50-200 cell/cu mm), mildly raised protein and normal or mildly decreased sugar.
- The diagnosis is confirmed by CSF–PCR suggestive of HSV expression in CSF and contrast enhanced MRI. EEG usually shows abnormality (slow waves/PLEDS) localised to temporal lobes.

High index of suspicion is required and diagnosis should be considered in any patient with progressive deteriorating level of consciousness, fever, abnormal CSF and focal neurological signs in the absence of other causes.

Treatment (Hospitalize the patient preferably in a set up with ICU facilities)

Nonpharmacological

For seizures (see section on status epilepticus).

In patients with signs of increased intracranial pressure raise head end of patient by 30 degree, intracranial pressure monitoring, & hyperventilation in intensive care unit

Maintain adequate hydration, however, in patients with syndrome of inappropriate ADH secretion (SIADH) restrict fluid intake

(CAUTION: prevent dehydration)

Pharmacological

1. Inj. Mannitol 20% 1 g/kg stat followed by 0.5 g/kg every 4-6 hours

   Or

   Sol Glycerol 30 ml 6 hourly orally
2. Start empirical treatment with Acyclovir in all cases at a very early stage or suspected of HSE pending confirmation of the diagnosis.

   (Role of steroids is controversial)

Inj. Acyclovir 10 mg/kg 8 hourly for 10 days. The drug should be diluted to a concentration not exceeding 7 mg/ml and infused slowly over 60 minutes. (Can cause local phlebitis if extravasation occurs).

If diagnosis of HSE is *definite* give treatment for 21 days to prevent relapse. However, in a stable patient *without* documented evidence of HSE including negative CSF-PCR and a normal MRI, acyclovir can be discontinued after 5 days of presumptive treatment.

Patient education

- Unlike most viral infections this is treatable and the drug used is quite safe.

References

1. Viral Meningitis and Encephalitis. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 2471-2481.

TUBERCULOUS MENINGITIS

Salient features

TB meningitis should be staged depending on the clinical symptomatology (Table 1)

Table 1. *Clinical staging of patients with tuberculous meningitis*

Stage I (early) Nonspecific symptoms and signs, no clouding of consciousness, no neurologic deficits.Stage II (Intermediate) Lethargy or alteration in behaviour, meningeal irritation, minor neurologic deficits (cranial, nerve palsies).

Stage III (Advanced) Abnormal movement, convulsions, stupor or coma, severe neurologic deficits (paresis).

- Typically, the CSF is clear or slightly opalescent. There is a moderate degree of pleocytosis (usually less than 500 cells), with a predominant lymphocyte response. Biochemical examination reveals raised protein, usually below 200 mg%. But in late cases and particularly when a spinal block develops the protein content may be as high as 1 to 1.5 g%. Sugar is reduced to 40 mg% or below. Smear-positivity has been reported in less than 10% of samples.
- A diagnosis of tuberculous meningitis is often made if a consistent clinical syndrome is accompanied by a consistent CSF profile, evidence of tuberculosis elsewhere in the body or response to specific antimycobacterial therapy in the absence of evidence for other diagnosis.

Treatment

1. Duration of therapy should be adjusted depending upon disease severity at diagnosis, treating stage I and II disease with INH, Rifampicin, and PZA for 9 to 12 months, stage III disease with all three drugs for 12 to 18 months, and tuberculomas with all three drugs for 18 to 24 months. (For details of therapy see tuberculosis in Chapter 1)
2. Corticosteroids are indicated in stage 2 or 3 disease or in case of the impending or established spinal block and are given for 3-6 weeks and tapered slowly over 2-4 weeks.

Tab. Prednisolone 60 mg/day or 1 mg/kg day .

Or

Tab. Dexamethasone 8-16 mg/day in divided doses in adults.

In children 8 mg/day or 0.3-0.6 mg/kg/day.

Note: See also tuberculous meningitis in Chapter 19).

References

1. Adjunctive Corticosteroid Therapy for Tuberculosis: A Critical Reappraisal of the Literature. In: Clin Infect Dis., 1997;25: pp 872-887.
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STROKE

Stroke is not a homogeneous condition. There are clear pathological sub-types: cerebral infarction, primary intracerebral haemorrhage and subarachnoid haemorrhage with over 100 potential underlying causes.

Salient features

- Presentation varies depending on the site of involvement. Common presentations are hemiplegia, aphasia, acute confusion, state of lower cranial nerve palsies.

Treatment (Immediatly following acute stroke)

- All patients with acute stroke should undergo CT brain scanning as soon as possible preferably within 48 hours and not later than 7 days.
- A swallowing assessment should be undertaken at home or hospital .
- Urgent neurosurgical assessment should be available for patients with large cerebellar infarcts or hydrocephalus, and for selected cases of cerebral haemorrhage.
- Identify and treat the underlying cause.
- High blood pressure should normally be lowered in the acute phase of stroke as follows:

Blood pressure management in an Intensive Care Unit

Elevated blood pressure

The following algorithm for antihypertensive therapy in patients with acute stroke may be applied in the first few hours of intracranial haemorrhage

1. If systolic BP >230 mmHg or diastolic BP >140 mmHg on two readings 5 minutes apart, institute Nitroprusside 0.5-1.5 mcg/kg/min then increased in steps of 500 mg/kg/min every 5 minutes within a range of 0.5-0.8 mcg/kg/min. Stop, if response is unsatisfactorry with maximum dose in 10 minutes.
2. If systolic BP is 180-230 mmHg, diastolic BP is 105-140 mmHg, or mean arterial BP is >130 mmHg on two readings 20 minutes apart, institute intravenous Nitroprusside (0.5-1.5 mcg/kg/min).
3. If systolic BP is <180 mm Hg and diastolic BP is <105 mm Hg, defer antihypertensive therapy.

Low blood pressure

Volume replenishment is the first line of approach. Isotonic saline or colloids can be used and monitored with the central venous pressure or pulmonary artery wedge pressure. If hypotension persists after correction of volume deficit, continuous infusions of pressors (Dopamine 2-20 mcg/kg/min) should be considered, particularly for low systolic blood pressure, such as systolic BP<90 mmHg.

Cerebral Infarction

No therapy has yet been confirmed to limit the neuronal damage associated with acute cerebral infarction.

- Management of patients with acute ischaemic stroke using thrombolytic therapy carries the risk of catastrophic intracerebral haemorrhage.
- Rt-PA in cerebral infarction demonstrates significant improvement in functional outcome in carefully selected patients treated in specialist units within 3 hours of stroke onset. This should not yet be regarded as a routine therapy, particularly without specialist centres.
- No benefit has been demonstrated for heparin, corticosteroids, nimodipine or other calcium channel antagonists, barbiturates, streptokinase, plasma volume expanders or haemodilution techniques in mortality in patients with acute ischaemic attack.

Subarachnoid haemorrhage

Acute headache with vomiting and altered sensorium and CT scan shows blood in the cisterns and CSFs uniformly blood stained.

Treatment

Immediately transfer the patient to a tertiary care centre with a neurosurgery set up after securing patent airway and blood pressure.

Secondary prevention

Tab. Aspirin (325 mg once daily) should be prescribed as early as possible.

In patients with non-valvular atrial fibrillation and also after cardioembolic stroke from valvular heart disease and recent myocardial infarction.

Tab. Warfarin 5 to 7.5 mg/daily to keep patients (International Normalized Ratio between 2-2.5).

Patient education

- Control of risk factors such as hypertension, hyperlipidaemia and cessation of cigarette smoking.

References

1. The International Stroke Trial Collaborative Group. The International Stroke Trial (IST): A Randomised Trial of Aspirin, Subcutaneous Heparin, both, or neither among

19435 patients with Acute Ischaemic Stroke. Lancet 1997; 349: pp 1569-1581.
2. Primary and Secondary Prevention of Stroke. In: Clin Exp Hyperten, 1996;18: pp 537-546.
3. Pharmacological Elevation of Blood Pressure in Acute Stroke. Clinical Effects and Safety. Stroke 1997;28: pp 2133-2138.
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ACUTE INFLAMMATORY DEMYELINATING NEUROPATHY/GUILLAIN-BARRE SYNDROME (GBS)

GBS is presumed to have immune-mediated pathogenesis with lymphocytic infiltration of peripheral nerves and destruction of myelin for which no specific cause can be demonstrated, although it is commonly preceded by a viral or other infection; it reaches a peak of disability within four weeks and follows a monophasic course with recovery.

Salient features

- Diagnostic criteria for GBS are progressive motor weakness of more than one limb and partial or total areflexia.
- Involvement of ventilatory muscles is common and can be diagnosed by presence of respiratory distress/shallow respiration, weak voice, inability to cough effectively and decreased inability to count in single breath.
- Features strongly supportive of diagnosis are progression up to 4 weeks, relative symmetry, mild sensory signs or symptoms, cranial nerve involvement, transient or absent bladder involvement, recovery 2-4 weeks after nadir, autonomous dysfunction and absence of fever at the onset; CSF features are protein elevated after first week and cell count < 10 mononuclear/mm; electrodiagnostic features are prolonged F-wave & distal latencies, decreased conduction velocities, conduction block.

Treatment

Nonpharmacological

- Hospitalization is necessary for even mild cases for observation of progression of neurological deficit.
- General care includes: care of back, bowel and bladder, pressure points.
- Physiotherapy should be instituted early.
- Ventilatory support in impending respiratory failure.

Pharmacological

Mild cases: No specific therapy is needed (corticosteroids have no role)

Severe cases: As indicated by progressive weakness, involvement of respiratory muscles, swallowing difficulty.

Inj. Human immunoglobulins 400 mg/kg day for 5 days.
(Contraindicated in patients with IgA deficiency).

Or

Plasmapheresis 40-50 ml/kg/exchange for a total of 4-5 exchanges over 7-10 days to a total of 250 ml/kg.

If facilities are available

- All patients to be closely monitored for (a) progression of motor weakness, (b) involvement of respiratory muscles, (c) autonomic disturbance e.g. retention of urine, hypo/hypertension.
- Catheterization and management of blood pressure changes may be undertaken if required.

Patient education

- Explain the natural course of the disease. It can progress to involve all the four limbs, respiration and swallowing.
- Disability can be reduced with treatment and most patients achieve complete or nearly complete recovery.
- Prognosis is bad in old age, rapidly progressive weakness and previous history of diarrhoea.
- Role of physiotherapy to be stressed.
- Provide psychological support.

References

1. Neurology in Clinical Practice. Walter G. Bradley; Robert B. Daroff; Gerald M. Fenichel; C. David Mardson (eds), 3rd Edition.

10

GENITO-URINARY CONDITIONS

NEPHROTIC SYNDROME

A clinical complex characterized by profuse proteinuria (>3.5 g/1.73 m^2/24 h), oedema and hypoalbuminemia. More than 90% of cases of nephrotic syndrome in adults are due to one of these – minimal change disease, membranous glomerulopathy, focal and segmental glomerulosclerosis, membrano-proliferative glomerulonephritis, diabetic nephropathy and amyloidosis.

Salient features

- Periorbital and generalized pitting oedema, transudative pleural effusions, ascites, xanthomata. Hypercoagulability predisposes these individuals to peripheral arterial or venous thrombosis, renal vein thrombosis, and pulmonary embolism.
- Proteinuria of > 3-3.5 g/24 h.
- Other associated abnormalties are hyperlipidemia, lipiduria and hypercoagulability.
- Renal biopsy is indicated in all adults and children > 10 years with nephrotic syndrome for establishing a definitive diagnosis, guiding therapy and estimating prognosis.

Treatment

Nonpharmacological

- Moderate salt restriction, usually 1-2 g/day (no cooking salt) and low cholesterol diet.
- There is no consensus regarding the optimal protein in diet for these patients. High protein diet is not recommended, as it may hasten the progression of renal disease by increasing proteinuria. A protein intake of 0.8-1 g/kg/24 h of mainly first-class proteins is recommended.

Pharmacological

Nonspecific measures

1. To reduce proteinuria in patients with diabetic nephropathy
   Tab. Captopril 6.25 – 25 mg/day in 4 divided doses.

Or

Tab. Enalapril 1.25 – 5 mg/day as a single dose.

NSAIDs reduce proteinuria in some patients by altering glomerular haemodynamics but benefit must be weighed against risks.

2. Tab. Frusemide 80–250 mg/day in two divided doses (8 AM, 2 PM), depending upon the severity of oedema. The aim is to remove upto 1.0 kg/day of oedematous fluid.
3. Only in-patients with symptomatic thrombosis
   Tab. Warfarin 2-4 mg/day (to titrate the dose to INR of 1.5-2.0).
   Patients may be relatively resistant to heparin.

Specific — Immunosuppression

Minimal change disease

Tab. Prednisolone 1-1.5 mg/kg/day for 4 weeks; followed by 1 mg/kg/day on alternate day for upto 16-24 weeks, depending upon the time to go into remission.

Upto 90% of adults go into remission when Tab. Prednisolone is continued for up to 24 weeks. 50% relapse on withdrawal of steroids. Monitor for presence of symptoms and proteinuria. Treatment of relapse is same unless the patients are resistant to steroids or relapse shortly after withdrawal of steroids (steroid dependent) or relapse occurs more than three times in a year, introduce the following:

Tab. Cyclophosphamide 2-3 mg/kg/day or chlorambucil 0.1–0.2 mg/kg/day for 8-12 weeks.

(**CAUTION:** Adequate hydration must be maintained and monitor for side effects e.g. cystitis, alopecia, infection, infertility, secondary malignancies)

If patients are resistant to the above following may induce remission in 60-80% of patients:

Tab./Cap Cyclosporin A 5 mg/kg daily in 2 divided doses as maintenance treatment reduced to lowest effective dose according to proteinuria and serum creatinine measurements; discontinue after 3 months if no response.

Monitor these patients for renal functions.

Focal and segmental glomerulosclerosis

Specific treatment - Same as above.

Membranous glomerulopathy

Treatment of underlying disease. If idiopathic steroids and immunosuppressive treatment has no role. About 40% respond spontaneously; 30-40% remit and relapse spontaneously; 10-20% show progressive decline in GFR over 10-15 years to end stage renal disease (ESRD).

Membrano-proliferative glomerulonephritis

No effective therapy; usually progress to ESRD over 5-10 years. (**CAUTION:** Patient who do not respond to steroids are excellent candidate for renal transplant)

References

1. Common Clinical Presentations and Symptoms in Renal Disorders. In: Oxford Textbook of Medicine. Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 3136-49.
2. The Major Glomerulopathies. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 1580-90.
3. Idiopathic Glomerulonephritis. In: Oxford Textbook of Medicine. Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 3153-61.

ACUTE RENAL FAILURE (ARF)

A significant decline in the renal excretory function, mostly associated with oliguria (<500 ml/day), occurring over hours or days, detected clinically by a rise in plasma concentration of urea and creatinine. Most of the times, ARF is reversible.

Salient features

- The clinical picture is usually dominated by the primary condition, which causes ARF. Manifestations of uremia like anorexia, nausea, vomiting, muscular cramps and signs of encephalopathy may appear later.
- For purposes of diagnosis and management ARF is divided into three categories
  i. Pre-renal due to renal hypoperfusion (55%).
  ii. Renal – due to disease which involve renal parenchyma (40%)
  iii. Post-renal due to diseases causing urinary obstruction.
- Complications of ARF include hyperkalemia, intravascular volume overload, hyponatremia, hypocalcemia, hyperphosphatemia, metabolic acidosis, anaemia, coagulation abnormalities and infections, arrhythmias, pericardial effusion, pulmonary oedema, GI bleeding due to stress ulceration.

Treatment

Identify the causative factors and triggering event and treat accordingly for disease-specific therapy and prevention and management of uraemic

complications.
Nutrition: Restrict dietary protein to 0.6 g/kg/day and carbohydrate to 100 g/day.

Treatment

Pre-renal ARF

1. Replacement fluids – Tailored according to the composition of lost fluids
   e.g. Blood transfusion/packed RBCs (if oliguria despite fluid correction) – in haemorrhage.
   Normal Saline (0.9%) in case of burns, pancreatitis, diabetic ketoacidosis.
   Hypotonic saline (0.45%) if increased urinary or GI losses.
   (Fluid intake = 500 ml + urine output + fluid loss from other sources)
2. Management of pulmonary edema, if present.
3. In patients with cirrhosis complicated by ARF, fluids should be administered slowly and titrated against JVP. Large volume paracentesis should be accompanied by IV albumin.

Intrinsic renal ARF (should be managed by a specialist) Approach for treatment depends upon the likely cause.

1. Acute glomerulonephritis, vasculitis – glucocorticosteroids, cyclophosphamide, and/or Plasmapheresis.
2. Allergic interstitial nephritis – glucocorticoids.
3. Malignant hypertension, toxemia of pregnancy – aggressive control of blood pressures.

Post-renal ARF

1. Suprapubic catheterization.
2. Referral to a urologist for removal of obstructing lesion.

Other essential measures

1. Strict intake/output recording.
2. Monitor serum K+ and acid-base status.
3. Reverse causative renal insult e.g. restore haemodynamics, eliminate nephrotoxins.
4. Prevention and treatment of complications.
5. Volume overload
   - Restrict salt (1-2 g/day- avoid all table/cooking salt and avoid food rich in sodium like milk) and water.
   - Inj. Fresemide IV dose depending upon extent of overload, usual dose is 40-120 mg/day.
   - Dialysis.

Hyponatremia

1. Restrict free water intake (<1 litre/day).
2. Avoid hypotonic IV solutions.

Hyperkalemia

1. Restrict dietary Potassium (K^+) 40 mmol/d (no food containing K^+).
2. Inj. Glucose insulin drip— 50 ml of 50% of dextrose with 10 units of plain insulin over 10 min.
   And/Or
   Inj. Sodium bicarbonate 50-100 ml of 4.2% IV 10 min.
   And/Or
   Inj. Calcium gluconate 10 ml of 10% solution over 5 min.
   (More than one steps taken if levels of serum $K^+ > 6.5$)
3. Cation exchange resins e.g. Sodium or Calcium polystyrene sulphonate 15 g orally 6 hourly.

Metabolic acidosis

1. Restrict dietary protein (0.6 g/kg/day).
2. Inj. Sodium bicarbonate IV to maintain an arterial pH of >7.2.

Hypocalcaemia

1. Tab. Calcium carbonate 1 g/day or
2. IV Calcium gluconate 10% 10-20 ml given over 20 minutes (if tetany).

Hyperphosphataemia

1. Restrict dietary phosphate intake (<800 mg/day).
2. Calcium carbonate as above.

Hyperuricaemia

1. Treatment necessary only if uric acid is >15 mg %.

Dialysis is indicated for any of the following:

1. Overt uremia manifesting as encephalopathy, pericarditis, uremic bleeding.
2. Intractable fluid overload.
3. Refractory hyperkalemia.
4. Rise in urea >20 mg% or creatinine >1 mg% in 24 hours.
5. Severe acidosis producing circulatory compromise.

Doses of all essential drugs for the underlying disease should be adjusted according to the degree of renal impairment.

Prevention

Since there are no specific therapy for ischaemic or nephrotoxic ARF, prevention is very important and includes:

- Aggressive restoration of intravascular volume in case of losses e.g. during surgery, trauma, burns, gastroenteritis etc.
- Avoid/reduce the dose of nephrotoxic drugs appropriately.
- Hypovolemia should be avoided in patients receiving nephrotoxic drugs.

References

1. Acute renal failure. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, Mc-Graw Hill Companies Inc., 2001, pp 1541-51.
2. Acute renal failure. In: Oxford Textbook of Medicine. Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 3279-94.

CHRONIC RENAL FAILURE (CRF)

An irreversible, substantial and usually gradual loss of renal function leading to a clinical and laboratory syndrome of uraemia. End stage renal disease (ESRD) would result in death without renal replacement therapy. The important underlying causes are diabetes mellitus, hypertension, chronic glomerulonephritis, chronic pyelonephritis, analgesic nephropathy and polycystic disease.

Salient features

- The *symptoms* of uraemia develop gradually and late. Fatigue, dyspnoea, anorexia, nausea, vomiting, ankle oedema, pruritis, purpura, and neuromuscular disturbances. Nocturia may be present.
- Examination may show the presence of pallor, nail dystrophy, purpura, hypertension, cardiomegaly, CHF, features of pulmonary oedema, pleural effusion and pericarditis with or without effusion. Fundus examination may show changes of hypertensive or diabetic retinopathy. The abnormalties in blood urea and creatinine may be detected during evaluation of anaemia.
- Elevated blood urea and creatinine, hypocalcemia, hyperphosphatemia, hyperkalemia and a partially compensated metabolic acidosis. Peripheral smear shows a normocytic, normochromic anaemia and urinalysis usually reveals proteinuria and low fixed specific gravity. Presence of shrunken kidneys on ultrasound suggests end-stage renal disease. Kidney biopsy is done if the kidneys are of normal size. A skeletal survey may show evidence of renal osteodystrophy.

Treatment

1. Identification and management of associated factors precipitating acute or chronic renal failure e.g., drugs, hypovolemia, infections, obstructive uropathy, hypertension, CHF, pregnancy or presence of any life-threatening emergency, requiring urgent treatment e.g. hyperkalemia,

pulmonary oedema, metabolic acidosis, uraemic encephalopathy or accelerated hypertension (Treat as mentioned under respective conditions).

2. Identification of specific cause of CRF and their treatment so as to delay the progress of CRF.
3. Modify loading and maintenance doses of drugs that are excreted through renal route.

Nonpharmacological

- Decrease protein intake to 0.6 g/kg/day of high quality protein.
- Phosphate restriction to 1000 g/day to reduce soft tissue calcification (avoid milk, egg etc.).
- Moderate sodium restriction to 60 mmol/day (low salt during cooking and avoiding foods rich in sodium) to control BP and oedema.
- Potassium restriction if CRF is moderate to severe (foods rich in K^+ include banana, citrus fruits, coconut water, papaya etc.)
- Fluid restriction is not generally necessary until late in renal failure.
- Sodium bicarbonate (baking powder) 600 mg QID if plasma HCO_3 is less than 20 mmol/liter.

Pharmacological

Control of hypertension, cardiovascular and pulmonary abnormalities

Target BP is 130/80-85 mmHg and in-patients with proteinuria >1 g/day, it is 125/75 mmHg (for details see section on hypertension).

The preferred drugs are:

Tab. Frusemide 40-160 mg per day.

Or

Tab. Amlodipine 5-20 mg per day.

And/Or

Tab. Atenolol 50-100 mg per day (contraindicated if concomitant cardiomyopathy with failure).

In diabetic nephropathy or CRF with proteinuria – ACE inhibitor/angiotensin receptor blocker with or without diuretic are preferred.

Treatment of pericarditis

Uraemic pericarditis is an absolute indication for initiation or intensification of dialysis. Heparin free dialysate should be used.

Treatment of anaemia

1. Look for common aggravating causes of anaemia e.g. (GI blood loss, iron deficiency and chronic infections) and treat. Assess iron status of patient before Erythropoietin (EPO) therapy.
2. Iron supplementation to ensure adequate response to EPO.
3. Inj. EPO subcutaneous 80-120 units/kg/week (divided into 2-3 times a week)

The target Hb should be 10-12 g/dl and optimal rate of correction should be to increase haematocrit by 4-6% over 4 week period.

Treatment of bleeding diathesis

Usually a problem arises when a patient of CRF needs to undergo some surgery.

Inj. Vasopressin (DDAVP) 0.3 mcg/kg in 100 ml of saline in 30 min, to be administered before surgery.

Treatment of bone, phosphate and calcium abnormalities and acid-base disturbances

1. Phosphate restricted diet.
2. Phosphate binding agents (aluminium based antacids)
3. Calcium carbonate— minimum of 1 g/day
4. Vit D3/Calcitriol – 0.25- 2 mcg day

Maintain serum calcium at about 10 mg% and phosphate at about 4.5 mg%

Treatment of hyperuricemia (gout) if it is symptomatic

Tab. Allopurinol 100-200 mg/day preferably after food, then adjusted according to plasma or urinary uric acid concentration.

Management of metabolic acidosis should aim to maintain a near normal value of bicarbonate

Calcium carbonate is usually adequate. If needed sodium bicarbonate can also be added.

For monitoring the progression of renal failure measure serum creatinine and creatinine clearance. ECG may show evidence of Left ventricular hypertrophy (LVH), pericarditis or hyperkalemia.

Absolute indications for dialysis

Development of complications that cannot be controlled by conservative and pharmacological means e.g., fluid overload, severe hypertension, pericarditis, refractory hyperkalemia, severe metabolic acidosis, encephalopathy and progressive neuropathy attributable to uraemia.

Renal replacement therapy (RRT) therapy should not be initiated when the patient is totally asymptomatic.

Renal Replacement Therapy (RRT): The choice of modality include – haemodialysis, continuous ambulatory peritoneal dialysis or renal transplantation, the choice depends on many factors – their availability, patient's preference and availability of potential donors.

Only kidney transplantation offers the potential for nearly complete rehabilitation.

Patient education

- Counselling as most of these patients have varying reactions to illness from anger to depression. Prepare the patient physically and psychologically for renal replacement therapy, when ESRD is inevitable.

References

1. Chronic Renal Failure. In: Harrison's Principles of Internal Medicine, Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., pp 1551-62.
2. Chronic Renal Failure. In; Oxford Textbook of Medicine, Weatherall DJ, Ledingham JGG, Warrell DA (eds), 1996, Oxford University Press, pp 3294-3306.

URINARY TRACT INFECTIONS (UTI)

UTI is defined as an infection of any part of the urinary tract. UTIs are common bacterial infections managed in general practice, particularly in sexually active women except in first year of life and in elderly, UTIs predominantly affect females.

Salient features

- **Lower UTI** includes infections of the urethra and bladder and can present with pain and burning during micturition, frequency of micturition, urgency, dysuria, pyuria or sometimes even haematuria. Fever is usually absent in lower UTI. Acute cystitis may present with suprapubic pain or discomfort.
- **Upper UTI** include infections of the kidneys and ureters. The symptoms usually develop rapidly, sometimes within a few hours. In addition to symptoms of lower UTI, these patients may have higher fever, chills, rigors and pain in the loins, nausea and vomiting.
- Sometimes UTIs may be asymptomatic, and are detected accidentally when the urine is tested. Asymptomatic infections are more common in pregnant women and the elderly. Untreated, asymptomatic bacteriuria in pregnancy can progress to upper UTI which can further lead to premature delivery and poor foetal outcome.
- Urine for pus cells - microscopic exam >10 pus cells/HPF and on culture bacterial growth i.e. $>10^5$/cu mm is diagnostic.
  In asymptomatic patients, two consecutive urine specimens should be examined and $>10^5$/cu mm bacteria of a single species should be demonstrable in both specimens before therapy is

instituted. The presence of bacteriuria of any degree in suprapubic aspirates or $>10^2$/cu mm in urine obtained by catheterization indicates infection.

Collection of urine sample

Collection of urine sample for culture should be from the midstream and should be preceded by adequate cleaning of external genitalia avoiding any antiseptic washes. Patients with recurrent UTIs should undergo ultrasonography of the genitourinary tract and micturating cystourethrogram to detect underlying structural or functional abnormality.

Treatment

General Principles

- Except in acute uncomplicated cystitis in women, diagnosis must be confirmed before treatment is begun and antimicrobial sensitivity should direct the therapy.
- Identify the predisposing factors and correct, if possible.
- Relief of clinical symptoms does not always include bacteriologic cure.
- Each course of treatment should be defined as failure or cure on the basis of symptoms and eradication of bacteria.
- Uncomplicated lower UTIs generally respond to short courses of therapy while upper UTI and complicated lower UTIs require longer treatment.
- Recurrences more than two weeks after cessation of therapy nearly always represent reinfection.
- Community acquired infections particularly the first infections are usually due to more antibiotic sensitive strains.
- In hospitalized patients, those requiring instrumentation and having recurrent infections, antibiotic resistant strains are the more likely cause of UTI.

Nonpharmacological

Plenty of oral fluids

Pharmacological

If symptoms are severe, antibiotics may be started empirically, after sending the urine samples. Otherwise, the antibiotics can be started as suggested by the culture and sensitivity report if symptoms are not severe.

1. The specific treatment regimen is shown in the Table 1.
2. Alkalinizing agents may be used with certain antibiotics like cotrimoxazole to prevent precipitation of crystals.
3 Tab. Pyridium up to 2 Tab. 3 times a day for the first 2-3 days as a urinary analgesic to relieve dysuria.

Prophylaxis

Antibiotics for prevention are recommended to women who have two or more episodes of infection within six months or three or more infections within one year

The recommended antimicrobials include daily or thrice weekly administration of a single dose of TMP-SMZ (80/400 mg), TMP alone (100 mg) or Nitrofurantoin (560 mg). Prophylaxis should be initiated only after bacteriuria has been eradicated with a full dose treatment regimen. Same regimen can be used as a single dose after sexual intercourse in women in whom episodes of symptomatic UTIs are related to sexual intercourse. Frequent urine cultures are essential during this period.

Suppressive antibiotics

Indicated in patients with repeated infections with an underlying cause, till the underlying cause is removed or controlled e.g. to infants and children with vesico-ureteric reflux till 3-5 years of age and to elderly requiring prolonged catheterization. The recommended drugs are same as above.

Note: See also UTIs in paediatric section.

Treatment

UTIs in pregnancy

Asymptomatic bacteriuria in pregnancy must be treated appropriately. (**CAUTION:** Cotrimoxazole and furoquinolones are not recommended during pregnancy)

UTIs in elderly

Treatment is not recommended for asymptomatic infections among the elderly, particularly men.

UTIs in catheterized patients

The need for treatment and optimal type and duration of treatment for such patients with asymptomatic bacteriuria have not been established. Removal of catheter with a short course of antibiotic may be appropriate. If catheter cannot be removed, bacteriuria should be ignored until patient is symptomatic or at high risk of developing bacteriuria.

Follow-up

Patient should be re-evaluated within 3-5 days for relief of symptoms and urine microscopic examination and culture examination should be repeated. In upper UTIs, fever and other symptoms normally subside within 2-3 days after starting the treatment. If symptoms do not subside within 5 days, underlying abnormalities like obstruction to the urinary tract, stones or collection of pus should be looked for. If the infection relapses after an initial treatment for 14 days, a six week treatment is recommended.

Table 1: ***Treatment regimen for bacterial urinary tract infections***

Condition	Characteristic pathogens	Mitigating Circumstance	Recommended Impirical Treatment
Acute uncomplicated cystitis in women	*E.coil, S. saprophyticus P. mirabillis, K pneumoniae*	None	3-day regimens: oral TMP-SMZ 160/800 mg BD, TMP 100 mg BD, Norfloxacin 400 mg BD, Ofloxacin 200 mg BD, Ciprofloxacin 500 mg BD
		Diabetes, symptoms for < 7d, recent UTI use of diaphragm age<65	Consider 7-day regimen: oral TMP-SMZ, TMP quinolone
		Pregnancy	Consider 7-day regimen: oral amoxicillin 250 mg TDS, cefpodoxime 100 mg BD
Acute uncomplicated pyelonephritis in women	*E.coil, S. mirabillis, S saprophyticus*	Mild to moderate illness-outpatient therapy	*Oral Ciproflaxacin 500 mg BD, ofloxacin 400 mg BD, amoxicillin 500 mg TDS, cefpodoxime 100 mg BD
		Severe illness-hospitalization required	Parenteral ciprofloxacin 200-400 mg BD, ofloxacin 200-400 BD, gentamicin 1 mg/kg TDS, ampicillin 1g QID, Ceftriaxone 1-2 g/d for 14 days
Complicated UTI in men & women	*E.coli, Proteus, Klebsiella, Pseudomonas Staphylococci*	Mild to moderate illness-outpatients therapy	Oral quinolone for 10-14 days (Doses as above)
		Severe illness or possible urosepsis-hospitalization required	Parenteral ampicillin and gentamcin, quinolone, ceftriaxone (Doses as above)# until defervescense; then oral quinolone for 10-15 days

TMP - Trimethoprim, SMZ - Sulfamethoxazole

- Both the partners to clean the genitalia before and after sexual intercourse
- Avoid diaphragm with spermicide as a contraceptive
- Wipe from front to back during eblution.

Patient education

- To drink plenty of water, at least 10 glasses per day
- Not to control the urge to pass urine. To empty the bladder completely and very often.
- To empty the bladder after sexual intercourse.

References

1. Urinary Tract Infections. In : Oxford Textbook of Medicine, Weatherall DJ, Ledingham JGG. Warell DA (eds), 3rd Edition, 1996, Oxford University Press, pp-3205-3215.
2. Urinary Tract Infections and Pyelonephritis. In: Harrison's Principles of Internal Medicine. Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp-1620-1626.
3. Acute Urinary Tract Infection. Health Update. A monthly bulletin of the society for health education and learning packages 1997; 1(8): 87-93.

11

HORMONAL DISORDERS

HYPOTHYROIDISM

Hypothyroidism could be primary; common causes of which are autoimmune, and iatrogenic due to I^{131}, antithyroid or lithium treatment and thyroidectomy, or secondary to pituitary or hypothalamic disease.

Salient features

- Coarse dry skin, hoarse voice, facial puffiness, weight gain, cardiac enlargement and/or pericardial effusion, goiter with or without prolonged relaxation phase of deep tendon reflexes.
- Myxoedema coma is a rare complication of severe hypothyroidism with hypothermia, hypoventilation, hyponatremia, hypoxia, hypercapnia and hypotension.
- Diagnosis is confirmed by low serum free FT3 and FT4, serum TSH raised in thyroid types and low in suprathyroid types. Thyroperoxidase (TPO) antibodies are present in 90-95% patients with autoimmune hypothyroidism.

Treatment

Pharmacological

Tab. L-thyroxine 25-100 mcg/d, increased by 25-50 mcg/d at 4 week intervals; mean replacement dose is equivalent to 1.6 mcg/kg/d. Higher dose may be started in young and lower dose in the elderly or those with cardiac disease especially coronary artery disease.

Increase in dose by 25-50 mcg/d may be required during pregnancy.

In hypothyroidism cases with low TSH (suprathyroid) cause is suspected requires detailed investigations referred to a tertiary care level.

Assess the response by clinically and serum TSH (serum T3 in suprathyroid type) at 8 weekly intervals; once euthyroid state restored, follow-up at 6-12 months intervals.

Myxedema coma

1. Warm blankets, mechanical ventilation for respiratory failure.

2. Correction of electrolyte disturbances.
3. L-thyroxine 500 mcg IV bolus, then 50-100 mcg IV daily; if IV preparation not available same dose via Ryle's tube. Once acute phase is over, maintain L-thyroxine as above.
4. Inj. Hydrocortisone 100 mg IV stat, 25-50 mg 8 hourly.

(**CAUTION-** Avoid sedatives)

Patient education

- L-thyroxine to be taken as single daily dose, ideally on awakening, at least 30 minutes before eating.
- Fiber and bran products (e.g. Isapaghula husk) may impair absorption, as also cholestyramine, colestipol, iron sulphate, sucralfate, aluminium hydroxide. Metabolism of L-thyroxine is increased by phenytoin, rifampicin, carbamezapine.
- Explain to the patient that the treatment is lifelong. Do not modify dose or stop treatment without consultation.
- Over treatment may lead to decreased bone mineral density and adverse cardiac consequences.

References

1. An update on the management of hyperthyroidism and hypothyroidism. Arch Intern Med 2000; 160: 1067-1071.
2. Disorders of the Thyroid Gland. In: Harrison's Principles of Internal Medicine, Braunwald E et al (eds.), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp-2060-2084.

HYPERTHYROIDISM

Classically occurs in Graves' disease, which is characterized by diffuse goiter, ophthalmopathy and dermopathy in varying combinations. Other important causes are toxic multinodular goiter (TMN) and toxic adenomas.

Salient features

- Sweating, tremors, wide pulse pressure, sinus tachycardia and atrial arrhythmias; worsening of angina or cardiac failure may predominate in older patients.
- Graves' disease have goiter, ophthalmopathy and dermopathy.
- Diagnosis is confirmed by low to undetectable serum TSH and increased serum free (FT3) and free (FT4).

Treatment

Pharmacological

1. Adjunctive treatment- for adrenergic symptoms like sweating, tremor and tachycardia.

   Tab. Propranolol 40-120 mg a day.

   Or

   Tab. Atenolol 50-200 mg a day to be continued until patient becomes euthyroid.

2. Tab. Propylthiouracil 100-150 mg every 6-8 hours.

   Or

   Tab. Carbimazole 10-20 mg every 8-12 hours after euthyroid state achieved in 6-8 weeks once daily dosing possible.

Review with serum TSH and FT3 after 3-4 weeks treatment has been initiated.

Once controlled reduce to smallest effective dose or continue initial dose combined with L-Thyroxine. Drugs are given for average of 2 years.

Definitive treatment is surgery/ablation of thyroid tissue (for details see thyroid swelling in surgery section)

Radioactive Iodine (I^{131}) Method of choice in the elderly, younger patients (completed family) with recurrent thyrotoxicosis following surgery or when surgery is refused/contraindicated.

(**CAUTION:** Radioiodine should never be given in pregnancy. In women of child bearing age if radioiodine treatment is planned, a pregnancy test must always be carried out).

Or

Surgery: Subtotal thyroidectomy in younger patients (< 30 years) in whom antithyroid therapy has been unsuccessful and in very large goiters.

Pregnancy

In pregnant women, surgery should not be performed in the 1st and 3rd trimesters. Antithyroid drugs are less risky but may induce hypothyroidism in the foetus and should be used in the smallest necessary dose to keep serum TSH and FT4 in normal range.

Propylthiouracil is preferred - usual maintenance dose is 200 mg/day. If >300 mg/day required during 1st trimester, subtotal thyroidectomy indicated in the 2nd trimester.

Propranolol should be avoided as it can cause fetal growth retardation and neonatal respiratory depression.

Ophthalmopathy (refer to an ophthalmologist)

Initiate therapy in mild cases with elevation of the head at night, diuretics to decrease edema, use of tinted sunglasses and 1% methylcellulose eye drops to prevent drying and refer patients with severe and progressive exophthalmous to an ophthalmologist.

Toxic Multinodular Goiter

Radioactive Iodine is the treatment of choice. Large doses are usually required. Treatment with antithyroid drugs given till patient is euthyroid. Propranolol may be useful before and after radioactive iodine administration.

Thyrotoxic crisis or thyroid storm (Refer to a tertiary care)

Life threatening exacerbation of hyperthyroidism with fever, vomiting, diarrhoea, jaundice, delirium and coma; usually precipitated by acute illness like stroke, infection, trauma, diabetic ketoacidosis, surgery or radioiodine treatment in a poorly prepared patient:

1. Tab. Propylthiouracil 600 mg loading dose, then 200-300 mg every 6 hours orally or through Ryle's tube.

   Or

   Tab. Carbimazole 15-25 mg 6 hourly.
2. 1 hour after 1st dose of antithyroid drug, saturated solution of Potassium iodide (SSKI) 5 drops every 6 hours.

   Or

   Lugol's iodine 10 drops 3 times a day.

   Or

   Sodium iodide 1 g IV slowly.
3. Tab. Propranolol 40-60 mg 4 hourly or 0.5-2 mg IV every 4 hr.
4. Inj. Dexamethasone 2 mg IV 6 hourly.

Continue iodides and dexamethasone until normal metabolic stage achieved and supportive treatment like cooling, antipyretics, antibiotics for infection, IV fluids, etc.

Once euthyroid status is achieved, manage as already outlined.

Patient education

- If fever or sore throat develops on antithyroid drugs complete blood count should be done; discontinue if PMN count $\leq 1500/mm^3$.
- If allergic rash or drug sensitivity develops, give antihistamines and preferably change to another drug. If agranulocytosis, hepatitis, drug

fever, arthralgias develop, preferably stop antithyroid treatment.
- Iodide- useful in impending thyrotoxic crisis and patients with severe cardiac disease; must be used only following antithyroid drugs.

References

1. A. Update on the management of hyperthyroidism and hypothyroidism. Arch Intern Med 2000; 160: 1067-1071.
2. Disorders of the Thyroid Gland. In: Harrison's Principles of Internal Medicine, Braunwald E et al (eds), 15th Edition, 2001, McGraw Hill Company Inc., New York, pp-2060-2084.

HYPOCALCAEMIA

Hypocalcaemia may be caused by hypoparathyroidism, pseudohypoparathyroidism, vitamin D deficiency states, chronic renal failure, malabsorption syndrome and hypomagnesaemia.

Salient features

- Circumoral paresthesias, muscle cramps, confusion, tetany, convulsions. Positive Chvostek's and Trousseau's signs.
- ECG may reveal prolongation of the QT interval.
- Total serum calcium <8.5 mg/dl. In hypoalbuminaemia, add 1 mg/dl of calcium to the estimated level for every one gram full of albumin below 4 g/dl (corrected serum calcium).

Treatment (Severe symptomatic Hypocalcemia)

20 ml of 10% Calcium gluconate solution over 10–15 min followed by 60–80 ml of 10% solution in 1 L 5% D/W (0.5–2.0 mg/kg/hour elemental Calcium).

(**CAUTION:** Should not be mixed with bicarbonate solution as it may result in precipitation of calcium carbonate).

If associated with hypomagnesemia Inj. Magnesium sulphate 1-2 g IV day 1 followed by oral Magnesium oxide 600-1200 mg 3 times a day to replenish stores.

Asymptomatic Hypocalcemia/Maintenance Treatment

Treat the underlying cause if possible. Usually long-term treatment required in conditions like hypoparathyroidism, pseudohypoparathyroidism, and chronic vitamin D deficiency states.

Tab. Calcium carbonate (40% elemental calcium by weight) 1–2 g elemental calcium orally 3 times a day initially and subsequently maintenance dose of 0.5–1 g 3 times a day.

In chronic renal failure calcium alone gives an inadequate response. However, correct concomitant hyperphosphataemia before instituting following therapy:

Vitamin D 50000 IU/day for 1-2 weeks, then weekly or bimonthly.

Or

Calcitriol 1,25$(OH)_2D_3$ 0.25 mcg orally daily – more expensive but less toxic than vitamin D for hyperphosphataemia - advise low phosphate (low cereal) diet and phosphate binding agents e.g. aluminium hydroxide.

Patient education

- Side effects of oral calcium carbonate are dyspepsia and constipation. Absorption requires gastric acid and is impaired in achlorhydria or when acid suppressive therapy is being given.
- Serum calcium should be monitored frequently (daily in severe hypocalcemia, weekly with moderate hypocalcemia for first month) and maintained at 8.0-8.6 mg/dl, and PTH and 24 h urinary calcium within 2-4 weeks of starting treatment.
- Once serum and urinary calcium is normal and PTH falls, maintenance treatment as described with reassessment at 3 monthly intervals.

References

1. Diseases of the Parathyroid Gland and other Hyper- and Hypocalcemic disorders. In: Harrison's Principles of Internal Medicine, Braunwald E et al eds., 15th Edition, 2001, McGraw Hill Company Inc., New York, pp-2205-2226.
2. Calcium. In: The Washington Manual of Medical Therapeutics, Ahya SN, Flood K, Paranjothi S eds., 30th Edition, 2001. Philadelphia : Lippincott, Williams & Wilkins, pp-60-66.

HYPERCALCAEMIA

The common causes are hyperparathyroidism and malignancy; others include excessive vitamin D action, high bone turnover or renal failure.

Salient features

- Fatigue, depression, confusion, anorexia, nausea, vomiting, constipation, polyuria, short QT interval on ECG and occasionally cardiac arrhythmias. Generally symptoms appear when serum Ca >11.5-12.0 mg/dl; severe hypercalcemia >15-18 mg/dl can result in death.

Treatment

Treatment varies with severity; mild hypercalcemia can be treated with

rehydration only, while severe hypercalcemia is treated as a medical emergency.

A. Mild

1. Rehydration-isotonic saline 2-4 L/day increases calcium excretion.
2. After correcting dehydration administrator
   Tab. Frusemide 40-80 mg every 1-2 hours.
   Monitor electrolytes especially potassium and magnesium and replace accordingly.

B. Moderate to Severe causes

1. Inj. Pamidronate 30-90 mg IV infusion in 0.9% saline over 4-24 h. Response lasts for weeks.
   Or
   Tab. Alendronate Sodium 10 mg orally in the morning with full glass of water at least 30 min before any food or drink; remain in upright position for at least 30 min.
2. Inj. Calcitonin 2-8 U/kg IV or SC or IM every 6-12 h; rapid but mild action.
3. Tab. Prednisolone 40-100 mg/day in 4 divided doses may be useful in osteolytic malignancies, vitamin D intoxication and sarcoidosis.
4. Tab. Phosphorus (sodium and potassium phosphate) 1-1.5 g per day in 4 divided doses for several days when hypophosphatemia is present.
5. Peritoneal dialysis with calcium-free dialysate is useful especially in cases complicated by renal failure.

Definitive treatment, wherever possible, is parathyroidectomy in hyperparathyroidism.

Patient education

- In patients with mild asymptomatic hypercalcemia due to hyperparathyroidism, advise to keep active, avoid immobilisation, drink adequate fluids and avoid thiazide diuretics, large doses of vitamin D or A and calcium supplements and calcium containing antacids.
- Check serum calcium and albumin twice a year, renal function and urine calcium once a year and bone density of distal radius once every 2 years.

References

1. Diseases of the Parathyroid Gland and other Hyper- and Hypocalcemic disorders. In: Harrison's Principles of Internal Medicine, Braunwald E et al Eds., 15th Edition, 2001. McGraw Hill Company Inc., New York, pp-2205-2226.
2. Calcium. In: The Washington Manual of Medical Therapeutics, Ahya SN, Flood K, Paranjothi S Eds., 30th Edition, 2001. Philadelphia: Lippincott, Williams & Wilkins. pp-60-66.

DIABETES MELLITUS

Diabetes Mellitus (DM) is a group of metabolic disorders characterized by hyperglycemia. DM is divided into 2 broad categories: Type 1 DM characterized by insulin deficiency, and type 2 DM characterized by variable degree of insulin resistance, impaired insulin secretion and increased glucose production.

Salient features

- Polyuria, polydipsia, polyphagia and unexplained weight loss with a random plasma glucose >200 mg/dl or fasting plasma glucose >126 mg/dl or 2 h plasma glucose >200 mg/dl after a 75 g glucose load.

Treatment of DM Type I

This type of DM will always require insulin in addition to dietary management.

Nonpharmacological

Principles of dietary therapy

1. Caloric requirement for normal weight individual: according to nature of work- Sedentary- 1800-2000 kcal/day
   Moderate - 2500-2800 kcal/day
   Heavy - 3200-3900 kcal/day
2. Caloric distribution
   Carbohydrate - 50-60%
   Protein - 10-20%
   Fat - 30% (10% each from poly, mono and saturated)
3. Carbohydrates quantity remains same as in normal, however no sweets and refined sugars to be given. Rice and potato can be consumed.
4. Enough amount of fibers should be consumed with every meal for better control of diabetes.
5. In overweight individual, low caloric diet to be given in consultation with dietician.
6. Pattern of distribution of calories over the day should not vary much from day to day.
7. Saccharide and aspartane (maximum 10-12 Tabs/day) can be used as sweeteners for beverages or deserts.

Pharmacological (DM Type I)

Insulin therapy

1. Therapy should be started with insulin (porcine/human) in a dose of 0.5 units/kg/day to 1.0 unit/kg/day.

2. Combination of regular + lente/semilente insulin should be used (now available as Premix preparation as well).
3. 1/3rd of the total insulin requirement is given as regular and 2/3rd as lente/semilente.
4. 1/3rd of the total dose is used before dinner and 2/3rd before breakfast.
5. Insulin is given SC 30-45 min before meals.
6. Medial aspect of thigh and abdominal wall are generally used for injection. The site of injection should be changed frequently. There is no need to use spirit swab if the skin is clean.
7. Dose, type and timing of insulin is adjusted according to pre-prandial blood sugar levels (80-150 mg%). Level of blood glucose estimated depends on dose of plain insulin taken 3-4 hours before or intermediate/long acting insulin taken 8-12 hours before the test.
8. Increment of dose should not be more than 10% of existing dose and dose readjustment should not be made earlier than 3 days.
9. Patients must be properly trained for administration of SC injections.
10. Meals must be ensured after injection.
11. Explain features of hypoglycemia.

Treatment (DM Type II)

It is possible to control mild DM type II with nonpharmacological therapy (dietary control and exercise), however, moderate and severe forms will require, in addition, one or more oral hypoglycaemics and occasionally insulin therapy.

Nonpharmacological

Diet: Basic principles of the diet are same as in DM type I. Most of the patients in DM type II are however obese and should be put on dietary restrictions for weight reduction.

Exercise: Regular physical exercise for 1/2 to 1 hour (for sedentary workers) is recommended to have a better control of diabetes.

Life style modification of increasing physical activity in day to day work is also recommended.

Pharmacological

If nonpharmacological measures are not sufficient. Oral agents may be used alone and in combination. Therapy can be started with either sulfonylureas or Metformin. Metformin has the advantage of promoting mild weight loss in obese patients.

Treatment may be started with any of the following drugs:

Tab. Glipizide 2.5 - 40 mg/day.

Or

Tab. Glipizide extended release 5.0-10 mg/day.

Or

Tab. Glyburide (Glibenclamide) 1.25-20 mg/day.

Or

Tab. Metformin 500 mg once or twice a day in obese patients and increase the dose to 850 mg 3 times a day or 1000 mg 2 times a day; The dose can be increased every 2-3 weeks

Or

Tab. Acarbose 25 mg before each meal, increase over weeks to months to 50-100 mg in case of post prandial hyperglycemia.

All drugs should be taken 30-45 min before meals.

Insulin may be required in patients with primary or secondary failure to oral agents; often as single dose of intermediate acting insulin 0.3-0.4 units/kg/day either before breakfast or at bedtime in combination with Tab. Metformin. Insulin is also required in situations like pregnancy, surgery, infection, etc.

Note: see also diabetes in paediatric section.

Patient Education

- Explain the nature of the disease and potential complications arising due to poorly controlled diabetes.
- Stress the importance of adhering to regular dietary schedule.
- Patient should always carry identification card along with diagnosis and the medication.
- Explain about the warning symptoms and signs of hypoglycaemia and need to take sweets/candies/drinks in such a situation.
- Regular followup to monitor BP, eye checkup and urine checkup.
- In patients with longstanding diabetes give instructions for care of feet, choice of footwear and avoid walking barefoot.
- Mainteance of general hygiene and skin care.

DIABETIC KETOACIDOSIS

Ketoacidosis is acute complication of diabetes, usually occurs in IDDM but can occur in NIDDM and characterized by hyperglycemia, hyperketonemia and acidosis. Important precipitating factors include poor compliance to treatment and infections/stress.

Salient features

- Nausea, vomiting, abdominal pain, dehydration and altered sensorium.
- Diagnosis is confirmed by demonstration of ketones in urine (or elevated levels in blood), hyperglycemia, low arterial pH, low bicarbonate (>15 mmol/l) and high anion gap (>15 mmol/l).

Treatment

Includes confirmation of diagnosis and continuous monitoring of the response to treatment as follows:

- Suspect and confirm diagnosis, assess fluid loss and degree of acidosis.
- Send blood for complete blood counts, glucose, renal functions, electrolytes and arterial blood gases.
- Evaluate for precipitating factor(s)/sepsis.

First Hour

- If blood pressure is normal, infuse 1000 ml of normal saline.
- If shock and oligemia, rapid infusion of normal saline until blood pressure rises to normal and subsequently continue with infusion, saline at the rate of 1 litre/hour.

1. Inj. Insulin (regular) 5-10 units/ hour IV infusion

   Or

   Inj. Insulin (regular) 20 units IM immediately followed by 5 units/hour.
2. Inj. Potassium chloride (KCl) 10-20 mmol (max 40 mmol) if serum K not more than 5 mmol/l and urine output is adequate.
3. Inj. Sodium bicarbonate 50-100 mmol infused over 30-60 minutes if arterial blood pH <7.00.
4. If infection/sepsis suspected Inj. Cefexime 1-2 gm IV 12 hourly to be started.

Second Hour

- Continue IV normal saline 500 ml/hour *(use 0.45% saline if serum sodium >150 mmol/l).*
- Continue insulin infusion as above (if blood glucose > 250 mg/dl).
- Continue IV infusion of KCl (rate of infusion adjusted according to serum level).

Third and Fourth Hour

- Continue as for second hour.
- Observe for cognitive/neurological functions.

Fifth to Eighth Hour

- Normal saline infusion 250 ml/hour; change to dextrose saline if blood glucose <250 mg/dl.
- Neutralizing insulin (1 unit per 2 g of glucose infused) infusion to continue until ketonuria disappears.

After Eight hours

- Continue IV fluids and insulin.
- Change to subcutaneous insulin when ketones disappear.
- Stop KCl infusion when plasma levels are normal.
- Change antibiotic if culture sensitivity report demands.

Patient Education

- Explain about the importance of regular intake of insulin and diet as per requirement.
- They should consult the physician soon if there is any symptom suggestive of infection.

References

1. American Diabetes Association: Clinical Practice Recommendations 2001. Diabetes Care 24 Suppl. 1, 2001.
2. Diabetes Mellitus. In: Harrison's Principles of Internal Medicine, Braunwald E et al (eds), 15th Edition, 2001. McGraw Hill Company Inc., New York, pp-2109-2137.

NON-KETOTIC HYPEROSMOLAR COMA

It is characterized by profound dehydration due to sustained hyperglycemic dehydration & hyperosmolarity, usually seen in elderly patients with type II DM, associated with stroke or sepsis.

Salient features

- Severe dehydration, altered sensorium and marked hyperglycemia. There may be features of venous thrombosis due to hyperviscosity.
- Other features include focal neurological deficit and sepsis.
- Diagnosed by finding very high blood glucose (> 500-1000 mg/dl) high plasma osmolality, acidosis and azotemia.
- Features like nausea, vomiting, abdominal pain and Kussmaul's respiration are characteristically absent.

Treatment

1. Normal saline or half normal saline (0.45%) 2-3 litres rapidly infused over 2-3 hours. Administration of 0.45% normal saline is indicated if serum sodium is > 150 mEq/L.
2. Inj. Insulin (regular) 5 units/hour as IV infusion.
3. Potassium chloride and sodium bicarbonate infusion as per requirement and administered as in ketoacidosis.

HYPOGLYCEMIA

Occurs due to increased utilization of glucose by the body (as during fasting, exercise or in alcoholics) or over dose of hypoglycemic agent(s).

Salient features

- Symptoms due to sympathetic stimulation (like anxiety, sweating, palpitation, tremors); neuroglycopenia (light headedness, confusion/altered sensorium, convulsions, focal neurological deficits) or general (weakness, hunger or blurred vision). Prolonged hypoglycemia may result in permanent neurological deficits.
- Diagnosis confirmed by estimation of blood glucose (< 40-60 mg/dl) by glucometer/diastix etc.

Treatment

1. Oral glucose, sweats/biscuits/sweet drink etc if patient present early signs and is conscious.
2. In any diabetic patient on treatment presents with coma & glucometer is not available give

   Inj. Glucose (25%-50%) 50-100 ml infused rapidly.

   If hypoglycemia documented, immediately give

   Inj. Glucagon 1 mg IV.

   If patient receiving long acting insulin/oral hypoglycemic agents, continue IV infusion of 5% glucose with regular monitoring of blood glucose hourly.

   NOTE: In case of doubt between hypoglycaemia and diabetic ketoacidosis always choose to give 25% dextrose because hypoglycaemia can kill a patient whereas slight rise in glucose in diabetic ketoacidosis will not alter the prognosis of the patient.

Patient education

- Explain about the symptoms of hypoglycemia. Stress upon regular intake of meals along with hypoglycemic agents and advise them to keep some sweet candies with them all the time. They should use these or any other sugar/glucose containing snacks/drinks at the earliest if symptoms of hypoglycemia are experienced.

References

1. American Diabetes Association: Clinical Practice Recommendations 2001. Diabetes Care 24 Suppl. 1, 2001.
2. Diabetes Mellitus. In: Harrison's Principles of Internal Medicine, Braunwald E et al (eds), 15th Edition, 2001. McGraw Hill Company Inc., New York, pp 2109-2137.

ERECTILE DYSFUNCTION

Psychogenic factors are very important. Other important aetiological factors are diabetes mellitus, atherosclerosis and numerous drugs especially antihypertensives. Besides a complete history, examination and routine investigations like complete blood picture, plasma glucose and lipid profile, special investigations like serum prolactin, serum testosterone and plasma gonadotrophins and at times vascular testing or psychological tests may be helpful.

Treatment

Nonpharmacological

Vacuum constriction devices.

Surgery e.g., surgical implant of semirigid or inflatable penile prosthesis.

Pharmacological

Tab. Sildenafil 25-100 mg; the onset of action is within 60-90 minutes. Lower initial doses in the elderly, in renal insufficiency, or patients on drugs like erythromycin, cimetidine and ketoconazole which may increase the serum concentration.

(**CAUTION:** Contraindicated with concomitant nitrate therapy, congestive heart failure and cardiomyopathy; cautious use in coronary artery disease, borderline hypotension, hypovolemia and patients on complex antihypertensive treatment).

Or

Inj. Testosterone enanthate 100-200 mg IM every 1-2 weeks in low testosterone states.

Or

Intraurethral Alprostodil (Prostaglandin E_1) semisolid pellets of 125-1000 mcg.

Or

Intracavernosal Alprostodil self-injection 1-40 mcg.

Patient education

- Counseling of both partners.
- Explain the side effects of sildenafil and other drugs. Sildenafil can cause headache, facial flushing, dyspepsia, nasal congestion and transient altered colour vision.

References

1. Erectile Dysfunction. In: Harrison's Principles of Internal Medicine, Braunwald E. et al eds., 15th Edition, 2001. McGraw Hill Company Inc., New York, pp 291-295.

12
ENT CONDITIONS

ACUTE SUPPURATIVE OTITIS MEDIA (ASOM)

ASOM is caused by inflammation of the mucous membrane lining the middle ear cleft (consisting of the eustachian tube, tympanic cavity, mastoid antrum and mastoid air cells) produced by pus forming organisms.

Salient features

- Severe throbbing pain in the ear, difficulty in hearing, and rarely giddiness and excessive crying in children.
- Often bilateral in children, preceded by upper respiratory tract infection.
- Congestion and bulging of ear drum leading to perforation and discharge.

Treatment

Nonpharmacological

Steam inhalation and to keep the ear clean in case of pus discharge.

Pharmacological

1. For fever Tab. Paracetamol 500 mg SOS (for details see section on fever).
2. Cap. Amoxycillin 250-500 mg 8 hourly for 7 days.
   In Children 20-40 mg/kg in 3 divided doses for 7 days.
   Or
   Cap. Cephalexin 250-500 mg 8 hourly.
   In Children 20-40 mg/kg/day in 3 divided doses.
3. Xylometazoline HCl 0.1% 1-2 nasal drops in each nostril 1-2 times daily.
   In Children (0.05%) 1-2 nasal drops 1-2 times daily.
   Or
   Oxymetazoline 0.05% 1-2 nasal drops in each nostril 2 times daily.
   In Children (0.01%) 1-2 drops 2 times daily.

Surgical treatment

Refer to an Otolaryngologist if there is intense pain, bulging of the ear drum or persisting fever despite treatment for myringotomy.

Patient education

- Treat upper respiratory and sinus infections at the earliest.

References

1. Acute Suppurative Otitis Media and Acute Mastoiditis. In: Scott Brown's Otolaryngology, Vol 3, JB Booth (ed) 6th Edition, pp 3/9/1-15.
2. Acute Otitis Media in Adults. In: Logan Turner's Diseases of the Nose, Throat and Ear 10th edition, pp 280-281.
3. Diseases of the Middle Ear Cleft. In: A synopsis of Otolaryngology 4th edition, pp 91-109.

CHRONIC SUPPURATIVE OTITIS MEDIA (CSOM)
(Tubo-tympanic type)

CSOM is characterized by the presence of a central perforation resulting from acute otitis media. It may present as an active disease when infection may occur through the nasopharynx or through the perforation thus causing ear discharge. In the inactive disease the only presenting feature is deafness.

Salient features

- Discharge - mucoid, intermittent, copious during acute exacerbation.
- Deafness - usually conductive type.

Treatment

Nonpharmacological

Aural toilet- by dry mopping or careful suction.

Pharmacological

Topical antibiotics -

1. Ciprofloxacin HCl 0.3% w/v ear drops 2-3 drops 3-4 times daily
2. When ear infection is associated with marked inflammation combine with Prednisolone 0.5% + Chloramphenicol 5% + Lignocaine 2% + Acetic acid 2% to be used as 3-4 drops 3-4 times daily.
3. In case of profuse mucopurulent discharge and for any associated upper respiratory tract infection give systemic antibiotics
   Cap. Amoxycillin 750-1500 mg in 3 divided doses
   In Children 20-40 mg/kg in 3 divided doses.
   The choice of antibiotic depends on the culture and sensitivity report of the pus.

Surgical treatment

Once the ear is dry and any local nidus of infection has been treated the ear is taken up for myringoplasty after assessing the hearing status.

Patient education

- The patient should not allow water or dust to enter the ear.
- The patient should take immediate treatment in case of upper respiratory tract infection.
- Do not instill oil if there is a discharge from the ear or if the patient is known to have perforation of ear drum.

References

1. Diseases of the external ear. In: Logan Turner's Diseases of the Nose, Throat and ear 10th edition, pp 271-273.
2. Management of chronic suppurative otitis media. In: Scott Brown's Otolaryngology, JB Boothy (ed), Vol 3, 6th edition, 1997, pp 3/10/1-11.

OTITIS MEDIA WITH EFFUSION

It is characterized by the presence of non-purulent fluid in middle ear cleft which may be because of eustachian tube dysfunction, unresolved otitis media or allergy.

Salient features

- Deafness- conductive type and tinnitus.
- Otoscopy may show retraction of the drum or air fluid level and air bubbles behind the drum.

Treatment

Pharmacological

1. Cap. Amoxycillin (as trihyd 250 mg) with Clavulanic acid (as pot. Salt) 375 mg, 1 Tab. thrice daily before meals for up to 21 days.
2. Tab. Psuedoephedrine 120 mg 8 hourly.
   In Children 1-2 mg/kg twice daily.

Surgical

Surgical measures may be necessary if patients do not respond to long term pharmacological measures. Surgery may include myringotomy with or without grommet insertion, adenoidectomy, treatment for sinusitis and even mastoidotomy in refractory cases.

Patient education

- Do not instill oil in the ear.

References

1. Management of Chronic Otitis Media. In: Scott Brown's Otolaryngology, JB Booth (ed), Vol. 3, 6th Edition, 1997, Butterworth-Heinemann, pp 3/9/1-15.

WAX

Wax (cerumen) is a mixture of the secretions of the ceruminous and pilosebaceous glands located in the cartilaginous portion of the external auditory canal.

Salient features

- Pain, deafness, tinnitus, vertigo and reflex cough.

Treatment

Pharmacological

If pain is severe

1. Tab. Ibuprofen 400 mg SOS.
   In Children 20 mg/kg/day divided into 3 doses.
2. Wax softener - (Turpentine oil - 15%, Benzocaine - 2.7%), Chlorbutol - 5%, Paradichlorobenzene - 2%) 3-4 days before cleaning the ear when the wax is hard.

Followed by surgical removal (to be carried out by an Otolaryngologist). Syringing with sterile saline solution at body temperature pushed along the posterior wall of the meatus to take out the wax. The meatus should be mopped dry after syringing. (**CAUTION:** if there is previous history of ear discharge or perforated drum).

Or.

Instrumental manipulation with ring probe, hook or forceps and suction cleaning.

Patient education

- Wax is a normal secretion and provides protection to the ear drum and should be removed only if it disturbs hearing.
- Cleaning the ear with buds can push the wax to the deeper canal.

References

1. Diseases of the External Ear. In: Logan Turner's Diseases of the Nose, Throat and Ear, 10th Edition, pp 265-267.

OTOMYCOSIS

It is the fungal infection of the external auditory meatus seen more commonly in tropical and subtropical climates. The fungi commonly found are *Aspergillus niger* and *Candida albicans*. Otomycosis may develop as a primary infection or as a mixed infection with bacteria.

Salient features

- Itching with or without pain, greyish -white fungal debris with or without black specks and ear blockage.

Treatment

Nonpharmacological

Regular ear toilet- by suction/dry mopping/instrumentation.

Pharmacological

1. Topical Clotrimazole as 1% powder or liquid 3 - 4 times a day to be continued for at least a week after clinical resolution of the infection.
2. Tab. Nimesulide 100 mg SOS.
   In children 1.5 mg/kg/dose SOS.
   Or
   Tab. Ibuprofen 400 mg SOS.
   In Children 20 mg/kg/day in 3 divided doses.

Patient education

- Ear is to be kept dry. Entry of water into the ear should be prevented.

References

1. Diseases of the External Ear. In: Logan Turner's Diseases of The Nose, Throat and Ear, 10th Edition, pp 274-275.
2. External Auditory Meatus. In: Scott- Brown's Otolaryngology, JB Booth (ed) Vol 3, 6th Edition, 1997, Butterworth-Heinemann, pp 3/6/14-15.

EXTERNAL EAR FURUNCULOSIS

It is due to staphylococcal infection of hair follicle in the outer cartilaginous part of the external meatus. It may be single or multiple. Abrasions facilitate infection, which is more common in diabetic patients. Careful history and local examination helps in differentiating it from mastoiditis.

Salient features

- Pain, tenderness, swelling, ear blockade.
- Regional lymphadenitis and sometimes discharge.

Treatment

Nonpharmacological

Local heat.

Pharmacological

1. 10% Ichthammol in glycerine wick pack.

   Or

   Antibiotic steroid cream wick pack (Polymyxin B sulphate 500 IU, Neomycin sulphate 3400 IU, Zinc bacitracin 400 IU, Hydrocortisone 10 mg, per g) wick packing to be done on alternate day till swelling subsides followed **by/or**
2. Local ear drops (Polymyxin B sulphate 1000 U, Neomycin sulphate 3400 U, Hydrocortisone 10 mg/ml).
3. Systemic therapy with antibiotics (see section on furunculosis in skin diseases)
4. Tab. Nimesulide 100 mg twice a day.
   In Children 5 mg/kg/day in 2-3 divided doses.

Incision and drainage may be necessary in some cases.

Patient education

- In patients having recurrent boils, diabetes mellitus should be ruled out and patients are instructed not to do ear picking.

References

1. Diseases of the external ear. In: Logan Turner's Diseases of the Nose, Throat and Ear 10th Edition, pp 271-273.
2. External auditory meatus. In: Scott- Brown's Otolaryngology Vol 3, JB Booth (ed), 6th Edition, 1997, Butterworth-Heinemann, pp 3/6/13-14.

COMMON COLD (CORYZA)

This is one of the most common acute viral infections affecting the upper respiratory tract.

Salient features

- Rhinorrhoea, nasal obstruction, malaise & fever.

Treatment

Nonpharmacological

Steam inhalation via nose 2-3 times/day for 2-3 days and rest. Home remedies (ginger, tulsi, honey).

Pharmacological

1. Tab. Chlorpheniramine 4 mg 8 hourly for 5-7 days.
   In Children 0.5 mg/kg/day divided in 3 equal doses.
   Or
   Tab. Pheniramine maleate 25 mg 2-3 times daily for 5-7 days.
   In Children 0.5 mg/kg/day divided in 3 equal doses.
   Or
   Tab. Cetrizine dihydrochloride 10 mg once a day 5-7 days.
   In Children 5 mg once a day.
2. If patient has malaise and fever,
   Tab. Paracetamol 500 mg 3-4 times a day for 2-3 days and then SOS.
   In Children 20-30 mg/kg/day divided in 4 doses or 10 mg/kg/doseSOS.
3. If nasal obstruction or rhinorrhoea is profuse,
   Saline nasal drops, 1-2 drops in each nostril 2-3 times daily.
4. If nasal obstruction is severe.
   Ephedrine 0.75% nasal drops, 1-2 drops in each nostril 3 times a day for 2-3 days.
   In Children 0.5% nasal drops, 1-2 drops in each nostril 2-3 times daily
   Or
   Oxymetazoline HCl 0.05% nasal drops, 1-2 drops in each nostril 2 times a day for 2-3 days.
   In Children 0.025%, 1 drop, 2 times daily.
   Or
   Xylometazoline 0.1%, 1-2 drops in each nostril 2 times a day for 2-3 days.
   In Children 0.05%, 1-2 drops, 1-2 times daily.
   (**CAUTION:** Not recommended in children below 6 years of age)

Medicated nasal drops should not be use for more than 7 days. Symptomatic improvement occurs within 48 hours in the form of decreased rhinorrhoea, nasal obstruction, paroxysmal sneezing, malaise and fever.

Patient education

- This is a self limiting viral infection and usually subsides in one week requiring only symptomatic relief.
- Antibiotics have no role.
- Chlorpheniramine and pheniramine can cause sedation and cognitive impairment, therefore, patient should avoid tasks requiring alertness and skill.

- Medicated nasal drops used for longer period can cause rebound congestion and rhinitis medicamentosa.

References

1. Acute Rhinosinusitis. In: Logan Turner's Disease of The Nose, Throat and Ear. 10th Edition, pp 34.

ALLERGIC RHINITIS

This is a IgE mediated hypersensitivity of the mucous membrane of the nasal passage.

Salient features

- Sneezing, itching, watery nasal discharge and a feeling of nasal obstruction.
- It may be associated with allergic conjunctivitis and bronchial asthma.

It can be divided into the following types

- **Seasonal allergic rhinitis (SAR/Hay fever):** sneezing, itching watery rhinorrhoea and conjunctivitis are prominent symptoms.
- **Perennial allergic rhinitis (PAR):** This differs from SAR as this is due to long standing nasal mucosal congestion. In this condition nasal discharge is more viscous or purulent. Usual symptoms are nasal blockage, post nasal discharge and hyposmia. Diagnosis can be made if patient is having two or more symptoms (viz. sneezing/itching, nasal discharge and nasal blockage) occurring for more than one hour on most days.

Treatment

Nonpharmacological

Avoid allergens.

Pharmacological

1. Tab. Cetrizine 10-20 mg in a single daily dose for 7 days
   In Children 5 mg in a single daily dose.

   Or

   Tab. Chlorpheniramine maleate 4 mg 6-8 hourly for 7 days.
   In Children 1-2 years 1 mg twice daily; 2/5 kg 1 mg every 3-6 hours; 6-12 years 2 mg every 4-6 hours.
   (**CAUTION:** Not recommended for children under 1 year)

Or

Tab. Pheniramine maleate 25-50 mg 8 hourly for 7 days.
In Children 0.5 mg/kg/day divided in 3 doses.
The duration of treatment may need to be extended depending upon the response of the patient.

2. If nasal obstruction and rhinorrhoea,
   Normal saline nasal drops 1-2 drops in each nostril 2 times daily.
   Or
   Xylometazoline 0.1% nasal drops 1-2 drops 2-3 times daily for 5-7 days.
   In Children 0.05% 1-2 drops 2 times daily.
   Or
   Oxymetazoline 0.5% nasal drops 2-3 drops 2-3 times daily for 5-7 days.
   In Children 0.025% 1-2 drops 2 times in each nostril
3. In case signs and symptoms are persistent
   Betamethasone nasal drops 2-3 drops 2-3 times a day.
   Or
   Hydrocortisone nasal drops 2-3 drops 2-3 times a day.
   Or
   Beclomethasone inhaler (50 mcg/puff) 2 puffs 12 hourly.
   Or
   Budesonide (50-100 mcg/puff) 1-2 puff a day.
   Or
   Fluticasone 150 mcg/puff 1-2 puff a day.
   Or
   Topical Azelastine intranasal spray 2-3 times a day.
4. In case of no response to the treatment outlined above,
   Tab. Prednisolone 5-60 mg/day in 3-4 divided doses for 5-7 days.
   Or
   Tab. Dexamethasone 0.5-5.0 mg/day in 3-4 divided doses for 5-7 days.
   Or
   Tab. Betamethasone 0.5-5.0 mg/day in 3-4 divided doses for 5-7 days.

Patient education

- This disease is due to hypersensitivity and there is no cure but symptoms can be controlled effectively by the judicious use of drugs and the patient can lead a normal life.
- Prolonged use of topical decongestant nasal drops to be avoided as it can cause atrophic rhinitis, anosmia and rhinitis medicamentosa.
- Chloropheniramine, pheniramine etc can cause sedation, cognitive impairment. Patient should avoid tasks requiring alertness and skill. These drugs can also cause dryness of the mouth and urinary hesitancy.
- Systemic steroids should not be stopped abruptly. Dose to be tapered off before cessation of therapy.

- Medicated nasal drops should not be used for more than seven days.

References

1. Mechanism and Treatment of Allergic Rhinitis. In: Scott Brown's Otolaryngology. JB Booth (ed), 6th Edition, 1997. Butterworth-Heinemann, pp 4/6/1-16.

FURUNCULOSIS OF NOSE (VESTIBULITIS)

The furuncle is an acute infection of hair follicle with *Staphylococcus aureus.*

Salient features

- Severe pain and tenderness over the tip of nose.
- There may be headache, malaise and pyrexia.
- Examination reveals congestion and swelling of the vestibule.

Treatment

Nonpharmacological

Local application of moist heat will enhance the localization of infection and promote drainage.

Pharmacological

1. Cap. Amoxycillin 500 mg 8 hourly for 5-7 days.
   In Children 25-50 mg/kg/day divided in 3 doses.
   Or
   Cap. Amoxycillin 250 mg + Cloxacillin 250 mg 8 hourly for 5-7 days.
   In Children 25-50 mg/kg/day divided in 3 doses.
   Or
   Cap. Amoxycillin 250/500 mg + Clavulanic acid 125 mg 12 hourly 5- 7 days.
2. Tab. Ibuprofen 400-600 mg 3 times a day for 5 days.
   In Children 10 mg/kg/dose.
   Or
   Tab. Paracetamol 500 mg 6 hourly for 2-3 days then SOS.
   In Children 10 mg/kg 6-8 hourly for 2-3 days and then SOS till pain and fever subsides.

Usually improvement in pain, tenderness and inflammation occurs within 24-48 hours after initiation of treatment. Patient should be monitored regularly. If there is flaring of infection in the form of spreading facial cellulitis then patient should be hospitalized and shifted to systemic intravenous antibiotics.If patient is having recurrent furunculosis, then the patient should be investigated for diabetes mellitus.

Patient education

- Do not fidget with the furuncle as this lies in the dangerous area of the face and can cause serious complications.
- Complete antibiotic therapy to avoid risk of developing antimicrobial resistance.

References

1. Diseases of the External Nose & Nasal Vestibule. In: Diseases of Ear, Nose & Throat, PL Dhingra's (ed), 2nd Edition, pp 144.

EPISTAXIS

The most important causes of epistaxis includes trauma in the form of nose-picking, hypertension, bleeding disorders, nasal mass and acute inflammation.

Salient features

- Bleeding from the nose and mouth.
- Shock due to excessive loss of blood.

Treatment

The treatment instituted will depend on a number of factors such as

- Type and severity of bleeding.
- Condition of the patient.
- Identification of a local or systemic cause for the bleeding.

1. In cases with active epistaxis, Check the vitals and pinch the nose (apply firm pressure below the nasal bone) then wait for 15 minutes and again check nose for bleeding. If bleeding does not stop refer to an Otolaryngologist for nasal cautery. Patient should be admitted in the hospital for nasal cautery.
   If nasal cautery is not able to stop bleeding do nasal packing (anterior, posterior, merocel). If bleeding is controlled start antibiotics and remove the pack after 48 hours. If bleeding not controlled arterial ligation, angiography and embolization may be required.
2. Simultaneously treat the underlying cause.

Recurrent epistaxis

Identify the cause and treat accordingly.

Patient education

- Patients must be advised against inserting fingers into the nose, especially children.

- As first aid, explain how to pinch the nose tightly and apply ice pack over the nose, while waiting for proper medical attention.

References

1. Epistaxis. In: Scott Brown's Otolaryngology, IS MacKay & TR Bull (eds) Vd4, 6th Edition, 1997, London: Butterworths, pp 4/18/1-19.

ACUTE RHINOSINUSITIS

This condition often occurs due to secondary bacterial infection after viral rhinitis.

Salient features

- Headache and facial pain, nasal obstruction, hawking and post nasal drip.
- Examination shows congested nasal mucosa, pus in the middle meatus and tenderness over sinuses.

Treatment

Nonpharmacological

Steam inhalation via nose 2-3 times/day for 2-3 days and rest.

Pharmacological

1. Tab. Paracetamol 500 mg 3-4 times a day for 5 days.
   In Children 10 mg/kg/dose.
   Or
   Tab. Ibuprofen 400 mg - 600 mg 3 times a day for 5 days.
   In Children 10 mg/kg/dose.
2. Cap. Amoxycillin 500 mg 8 hourly for 5-7 days.
   In Children 50 mg/kg/day in 3 divided doses.
   Or
   Tab. Ciprofloxacin 250-500 mg twice a day for 5-7 days.
   (not recommended in children)

In sinusitis of dental origin

1. Cap. Amoxycillin 500 mg 3 times a day for 5-7 days.
2. Tab. Metronidazole 400 mg 3 times a day for 5-7 days.

   Or

1. Tab. Ciprofloxacin 500 mg 3 times a day for 5-7 days.
2. Tab. Tinidazole 600 mg 3 times a day for 5-7 days.
3. Tab. Bromhexine 8 mg 3 times a day for 7 days.
4. If nasal obstruction or rhinorrhoea,
   Normal saline nasal 1-2 drops in each nostril 2-3 times a day.

Or

Ephedrine 0.75% nasal drops in isotonic saline 1-2 drops in each nostril 2 times a day.

In Children 0.5% 1-2 drops in each nostril 2 times daily.

Or

Oxymetazoline HCl 0.05% nasal drops. 1-2 drops in each nostril 2 times a day.

In Children 0.025% 1-2 drops in each nostril 2 times daily.

Or

Xylometazoline 0.1% nasal drops 2-3 drops in each nostril 2-3 times a day.

In Children 0.05% 1-2 drops in each nostril 2 times daily.

(CAUTION: Medicated nasal drops should not be used for more than 7 days).

Improvement is seen in symptoms viz. pain tenderness, nasal obstruction and discharge within 48-72 hours after initiation of therapy. If there is no desirable response patient should be referred to a Otolaryngologist.

Patient education

- To take full course of systemic antibiotics to avoid the risk of developing antimicrobial resistance.
- Prolonged use of topical decongestants more than a week to be avoided as it can cause atrophic rhinitis, anosmia and rhinitis medicamentosa.

References

1. Acute Rhinosinusitis. In: Logan Turner's Diseases of Nose, Throat and Ear. 10th Edition pp 34-36.

ACUTE TONSILLITIS

It is the acute inflammation of the palatine tonsils, generally bacterial in aetiology.

Salient features

- Pain in the throat aggravated on swallowing and congestion of the tonsils and the anterior pillars.
- Fever and malaise.
- Enlarged and tender jugulodigastric lymph nodes.

Treatment

Nonpharmacological

Plenty of oral fluids and rest and warm saline gargles.

Pharmacological

1. Cap. Amoxycillin 500 mg 3 times a day.
   In Children 50 mg/kg/day in 3 divided doses for 7 days.
   Or
   Cap. Erythromycin 500 mg four times a day.
   In Children 50 mg/kg/day in three divided doses for 7 days.
2. Tab. Paracetamol 8-10 mg/kg 6-8 hourly and SOS for pain and fever, till fever subsides.
   Or
   Tab. Nimesulide 1.5-2 mg/kg/day and SOS for pain and fever, till fever subsides.

Patient education

- In case of development of any complication such as peritonsillar abscess or peritonsillitis, the patient should be admitted for intravenous antibiotic treatment and/or surgical drainage, if required, under the supervision of an ENT surgeon.
- In case of recurrent episodes of acute tonsillitis, more than 4-5 annually, the patient must be referred for surgical modality of treatment.

References

1. Acute and Chronic Tonsillitis. In: Diseases of Ear Nose and Throat, Dhingra PL (ed), 2nd edition 1998.

ACUTE PAROTITIS

It is an acute bacterial infection of the parotid gland.

Salient features

- Swelling at the angle of mandible pushing ear lobule laterally, generally unilateral, induration and tenderness of gland. Purulent saliva may be expressed from the duct opposite the upper second molar.

Treatment

Nonpharmacological

Adequate hydration, good oral hygiene, repeated massage of the gland.

Pharmacological

1. Cap. Cloxacillin 20-40 mg/kg in 3 divided doses for 7 days.
   Or
   Tab. Ciprofloxacin 500 mg twice daily for 7 days in adults.
2. Tab. Paracetamol 8-10 mg/kg thrice daily for 3 days & then SOS, if pain and fever persists.
   Or
   Tab. Nimesulide 1.5-2 mg/kg twice daily for 3 days & then SOS, if pain and fever persists.
3. Antiseptic mouthwash containing (Povidone Iodine 1% or Chloroxylenol 1.02%, Menthol 0.12%, Absolute Alcohol 60.8%) to be used 3 times a day.

In case parotitis is not responding, and there is increasing swelling over the parotid region or development of induration over the gland, it may require incision and drainage. This should be done by a Otolaryngologist in a direction parallel to the direction of the facial nerve.

Patient education

- To maintain good oral hygiene.

References

1. Non Neoplastic Diseases of Salivary Glands. In: Diseases of Ear Nose and Throat Dhingra PL (ed) 2nd Edition, 1998.

FACIAL PARALYSIS

The VII Cranial nerve is frequently affected in diseases of the ear. The central causes (upper motor neuron type) are brainstem infarction, tumours and multiple sclerosis. The peripheral causes are inflammatory (ASOM, CSOM or herpes zoster oticus), traumatic (accidental or iatrogenic), neoplastic or idiopathic (as in Bell's palsy or Melkersson's syndrome) and due to systemic diseases such as diabetes mellitus, sarcoidosis and demyelinating diseases etc. The paralysis is of the lower motor neuron type, i.e., it affects the entire face on the ipsilateral side.

Treatment

Nonpharmacological

Treat the underlying cause of the lesion. Surgical intervention is often indicated in peripheral causes like ASOM, CSOM and tumours.

Pharmacological (Idiopathic paralysis of the Facial Nerve - Bell's palsy)

Tab. Prednisolone 2 mg/kg/day in single or two divided doses, for 1 week (maximum: 60 mg/day). Review after one week.

If clinical Improvement is present, taper steroids over 4-5 days. If no clinical improvement: continue for another week before tapering the dose. If recovery does not occur: surgical intervention may be required.

Patient education

- Wear an eye pad over the affected eye or use lubricant eye drops to avoid exposure keratitis.
- Facial exercises to be done.

References

1. Facial Nerve and it's Disorders. In: Diseases of the Ear, Nose and Throat. PL Dhingra (ed), 2nd Edition, 1998, pp 95-105.

13
EYE CONDITIONS

STYE (HORDEOLUM EXTERNUM)

Acute suppurative inflammation of lash follicle and its associated glands of Zeis or Moll caused by *Staphylococcus aureus* presenting as painful swelling at the base of cilia.

Treatment

Nonpharmacological

Hot fomentation and epilation of infected cilia 2-3 on either side.

Surgical treatment

Nicking the pustule using sharp tip of a needle and blade and express the purulent material.

Pharmacological

Topical antibiotics -

1. Gentamicin 0.3% eye drops 1 drop 6 hourly.
   Or
   Ciprofloxacin 0.3% eye drops 6 hourly.
   Or
   Ciprofloxacin eye ointment 2 times a day.
   Or
   Bacitracin eye ointment 2 times a day.
2. Systemic antibiotics if excessive oedema or cellulitis.
   Cap. Erythromycin 30-50 mg/kg in 4 divided doses for 5-7 days.
3. Tab. Ibuprofen 400 mg 3 times a day after meals.

Exclude refractive error and diabetes mellitus in recurrent cases.

Patient education

- Avoid rubbing of eyelids with dirty hands.
- Use glasses for refractive error.
- Maintain proper ocular hygiene to prevent recurrence.

References

1. Lid inflammations. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Gragoudas (eds), 2nd Edition, 2000. WB Saunders Co, pp 829-846.

CHALAZION

It is a chronic inflammatory lipogranuloma of Meibomian glands presenting as solitary or multiple nodular swelling of tarsal plate.

Treatment

Nonpharmacological

Warm compresses for 4 weeks may relieve small chalazia of short duration.

Pharmacological

Tiny chalazia may be ignored.

Intralesional, Triamcinolone acetonide 5-10 mg/ml preparation inject 0.05 to 0.2 ml from the conjunctival side after local anaesthesia or from skin side. Repeated after 2-4 weeks if no resolution.

Surgical treatment

1. Incision and curettage for large chalazia (>6 mm) or those who present for more than 3-4 month duration.
2. Excisional biopsy for recurrent and hard chalazia in elderly.

Patient education

- The condition may recur at the same site or different site, involving any eyelid.
- Recurrence of chalazia at the same site may be harbouring malignant disease.
- Intralesional triamcinolone can cause steroid-induced glaucoma and hypopigmentation of skin.

References

1. Lid inflammations. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Gragoudas (eds), 2nd Edition, 2000. WB Saunders Co, pp 829-846.

VITAMIN A DEFICIENCY (XEROPHTHALMIA)

Xerophthalmia is characterized by night blindness, epithelial conjunctival xerosis, Bitot's spots and keratomalacia and fundus changes in severe cases.

Treatment

Pharmacological

1. (a) Cap of Vitamin A (Vit. A) should be administered immediately on diagnosis as mentioned below:

- <6 months of age - Three doses of oral Vit. A 50,000 IU each immediately on diagnosis, the next day and at least 2 weeks later.
- 6-12 months of age - Three doses of oral Vit. A 100,000 IU immediately on diagnosis, the next day and at least two weeks later.
- >12 months of age - Three doses of oral Vit. A 200,000 IU each immediately on diagnosis, the next day and at least 2 weeks later.
- Women of reproductive age with night blindness or Bitot's spots - ≤10,000 IU Vit. A daily or weekly doses of ≤25,000 IU.
- Women of reproductive age whether or not pregnant with severe signs of active xerophthalmia (acute corneal lesions) - Three doses of oral Vit. A 200,000 IU each immediately on diagnosis, the next day and at least 2 weeks later.

(b) Water miscible Vit. A preparation is given IM for children suffering from persistent vomiting, severe diarrhoea and intestinal parasites. If there is gross purulent discharge due to bacterial superinfection in keratomalacia.

2. Gentamicin/Tobramycin eye drops 14 mg/ml drops hourly.
3. Cefazolin 50 mg/ml drops 1 hourly till infection resolves.

If corneal ulcer present (see section on corneal ulcer).

Patient education

- Regular consumption of Vit. A rich foods particularly fresh dark green leafy vegetables which constitute very rich and cheap sources of Vit. A.
- Pregnant women and lactating mothers should also consume Vit. A rich diet regularly.
- Breast feeding including feeding of new borns with rich colostrum.
- High dose universal distribution schedule for prevention of Vit. A deficiency.
- Infants <6 months of age.

- Non-breast fed infants - 50,000 IU orally.
- Breast-fed infants whose mothers did not receive supplemental Vit. A - 50,000 IU orally.

- Infants 6-12 months of age - 100,000 IU orally every 4-6 months till 5 years of age.
- Children >12 months - 200,000 IU orally every 4-6 months till 5 years of age.
- Mothers - 200,000 IU orally within 8 weeks of delivery.
- Excessive consumption of Vit A can cause hypervitaminosis A.

References

1. Nutritional Blindness. In: Principles and Practice of Ophthalmology Vol 1-6, 2nd Edition, 2000. WB Saunders Co., pp 4760-4766.

RED EYE

Red eye may be painful or non-painful. Non painful red eye is caused by conjunctivitis, lid abnormalities e.g. trichiasis, entropion, blepharitis, meibomianitis, ectropion, lagophthalmos, molluscum contagiosum, episcleritis, subconjunctival haemorrhage, inflamed pinguecula and pterygium. Painful red eye is caused by acute attack of primary angle closure glaucoma, phacomorphic glaucoma, corneal ulcer/keratitis, acute anterior uveitis, scleritis and endophthalmitis; may be associated with circumcorneal congestion (ciliary injection).

NON-PAINFUL RED EYE

Conjunctivitis may be classified into:

i) Infective conjunctivitis caused by bacterial, viral, or chlamydial microorganisms.

ii) Allergic conjunctivitis.

A. Bacterial Conjunctivitis

Bacterial conjunctivitis manifests as acute mucopurulent, purulent, angular & membranous conjunctivitis.

Acute mucopurulent conjunctivitis

Common aetiological microorganisms are *Staphylococcus aureus, Haemophilus aegyptius (Koch-Week's bacillus), Streptococcus pneumoniae, Streptococcus viridans* and *pyogenes*.

Salient features

- Unilateral or bilateral red eye, conjunctival congestion, mucopurulent or purulent discharge, stickiness of eyelids, matting of cilia, no photophobia in uncomplicated cases.
- Cornea, pupil and visual acuity normal, however, in case of corneal involvement pain, photophobia and circumcorneal congestion.
- Common complications are diffuse superficial punctate keratitis, marginal corneal infiltrates and blepharitis.

Treatment

Nonpharmacological

Do not patch or bandage the eye, use dark glasses to prevent photophobia, maintain good personal and ocular hygiene. Clean the eye with simple water 3-4 times a day or irrigate conjunctiva with sterile normal saline twice a day. Patient's towel, handkerchief or other fomites should not be shared.

Pharmacological

1. Eye drops Gentamicin 0.3% eye drops or Framycetin 0.5 to 1% or Ciprofloxacin 0.3% or Chloramphenicol 0.5 to 1% eye drops 1 drop every 2-3 hourly in day time and Gentamicin or Ciprofloxacin eye ointment instilled in inferior fornix at bed time for 5-7 days.
2. If there is evidence of cellulitis or fever treat accordingly (see section on cellulitis).

(**CAUTION:** corticosteroid drops are contraindicated)

If there is no response to empirical therapy after 7 days stop all antibiotics and conjunctival scrapping should be obtained for Gram's stain and culture and sensitivity studies. Appropriate antibiotic should be selected based on culture sensitivity reports.

Acute Purulent Bacterial Conjunctivitis

Acute purulent conjunctivitis can affect new born babies, adolescents and adults. The most fulminant form of purulent conjunctivitis occurs due to N. gonorrhoea. It is characterized by severe lid edema, erythema, chemosis, thick purulent discharge, preauricular lymphadenopathy and frequent corneal involvement.

Gonococcal conjunctivitis –Adults (See section on ophthalmia neonatorum)

OPHTHALMIA NEONATORUM

It is also called conjunctivitis of the new born, neonatal conjunctivitis and occurs during the first 28 days of life. It may be due to gonorrhoea or nongonococcal bacteria. In the later type *Herpes simplex II* is the aetiological agent in 80% of the cases. The infection is acquired from the maternal birth canal.

Salient features

- Complications like corneal blindness, cataract, nystagmus, endophthalmitis or panophthalmitis and metastatic stomatitis and arthritis can occur.

Treatment

Nonpharmacological

Irrigate conjunctival sac with warm normal saline before antibiotic instillation, wipe away the discharge with moistened cotton wool.

Pharmacological (Gonococcal Ophthalmia Neonatorum)

Topical therapy

1. Crystalline Benzyl penicillin aqueous solution 10,000 to 20,000 U/ml, (mix 5-10 ml of distilled water in a vial containing 5 lacs units of Penicillin G) instilled 1 drop every hour for 6 to 12 days and then 1 drop every 2-3 hours till the infection is resolved.

   Or

   Tobramycin 0.3% eye drops every two hourly for 10 days

   Or

   Gentamicin 0.3% eye drops at every one hour interval

   Or

   Ciprofloxacin 0.3% eye drops every hour and 0.3% eye ointment at night.
2. If corneal involvement (see section on corneal ulcer).
3. Systemic Treatment
   - In full term babies with normal birth weight after sensitivity testing Inj. Procaine Penicillin G 4.8 million units in 2 divided doses IM for 7 days.
   - In preterm low birth weight babies,
     Inj. Procaine Penicillin G 20,000 units/kg/day 2-3 divided doses IM or IV for 3 days.

     Or

     Inj. Ceftriaxone 125 mg as a single IM dose (for penicillin allergic patients).

     Or

     Inj. Cefotaxime 100 mg/kg IM as a single injection.
4. Also treat mother with systemic therapy.
5. Treat Chlamydial infection simultaneously as it may also coexist.

Non gonococcal bacterial Ophthalmia Neonatorum

It is a milder disease occurring within 5-14 days after birth. It is caused by chlamydial, bacterial or herpetic infection.

Treatment

1. Ciprofloxacin 0.3% eye drops 1 drop every 2-4 hours and 0.3% eye ointment at night for 2 weeks.

   Or

   Gentamicin 0.3% eye drops every 1 drop 2-4 hours and eye ointment at night for 2 weeks.
2. If evidence of systemic involvement
   Syp. Erythromycin 50 mg/kg/day in 4 divided doses for 14 days.
   If extensive conjunctival or corneal involvement also treat the parents primarily mother. If no response after 1 week of therapy refer for an appropriate culture and sensitivity testing to a tertiary care level.

Prophylaxis

Antenatal Care

Screening of high risk pregnant women (pregnant women with vaginal discharge, dysuria, STD such as syphilis, genital herpes etc., unsteady sexual partners, sexual contact with a partner with an unspecified STD) and treatment of maternal urogenital infections during pregnancy and sexual partner.

Treatment (gonorrhoea in pregnant women)

1. Inj. Procaine penicillin 4.8 million IV/IM injection with 1 g oral probenecid.
2. In Penicillin resistant cases, Inj. Spectinomycin 4 g in 2 divided doses IM single injection in gluteal region.

Treatment (chlamydial urogenital infection in pregnant women)

Tab. Roxithromycin 150 mg 2 times a day orally for 2 weeks (estolate salt is contraindicated).

Or

Cap. Amoxycillin 500 mg orally 3 times a day for 7 days (in late pregnancy Erythromycin preferred).

Intranatal Care - meticulous aseptic precautions during delivery.

Postnatal care

Careful cleaning of closed eyelids immediately after birth.

Povidone - Iodine 2.5% in both eyes 1 drop within 20 minutes of birth.

Or

Tetracycline hydrochloride 1% eye ointment Or Erythromycin 0.5% eye ointment Or Silver nitrate 1% solution Or Gentamicin 0.3% eye drops and ointment Or Norfloxacin 0.3% eye drops and eye ointment Or Ciprofloxacin 0.3% eye drops and ointment application after cleaning the eye.

Suspect ophthalmia neonatorum if there is any mucopurulent discharge from the eyes during first week.

References

1. Bacterial Infections of the Conjunctiva and Cornea. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Gragoudas (eds), 2nd Edition, 2000, WB Saunders Co, pp 893-905.

B. CHLAMYDIAL CONJUNCTIVITIS- TRACHOMA

Trachoma is a chronic bilateral cicatrizing follicular keratoconjunctivitis caused by *Chlamydia trachomatis* and is the leading cause of preventable blindness worldwide.

Salient features

- Presence of at least two of the following signs: superior tarsal follicles, limbal follicles (Herbert's pits), typical conjunctival scarring and vascular pannus. Diagnosis is confirmed by conjunctival cytology.

Treatment

Pharmacological

1. Tab. Roxithromycin 150 mg 2 times a day for 7 days.
   In children 5.8 mg/kg in 2 divided doses.

   Or

   Cap. Doxycycline 100 mg 2 times a day for two weeks.
   (**CAUTION:** Contraindicated in children, pregnant women and nursing mothers)

   Or

   Tab. Sulfamethoxazole 400 mg + Trimethoprim 80 mg 2 tablet twice daily for 3 weeks;
   In children 6-12 years: half the above dosage for 3 weeks.

   And/Or

2. Tetracycline 1% eye ointment at night for 6 weeks.
3. Sulfacetamide 10-20% eye drops 3-4 times for 6 weeks.

   Or

   Ciprofloxacin 0.3% ophthalmic solution 4 times a day and Ciproflaxacin 0.3% eye ointment at night for 8 weeks.

Surgical treatment

Eyelid surgery for correction of trichiasis and entropion to prevent corneal blindness.

Patient education

- Treat the whole family even if only one child has active trachoma.
- Improve ocular hygiene - facial cleanliness in children.
- Environmental improvement - eliminate flies, provision of adequate running water supply and latrines etc.

References

1. Chlamydia and Acanthamoeba infections of the eye. In: Principles and Practice of Ophthalmology. Albert and Jakobiec Azar Gragoudas (eds), 2nd Edition, 2000. WB Saunders Co, pp 915-925.
2. Primary Health Care Level Management of Trachoma, 1993, WHO/PBL/93.33.

C. VIRAL CONJUNCTIVITIS

Viral conjunctivitis often occurs in epidemics. It includes following entities: epidemic keratoconjunctivitis, pharyngoconjunctival fever, acute haemorrhagic conjunctivitis and Newcastle conjunctivitis.

Salient features

- Conjunctival congestion, chemosis, watery discharge conjunctival haemorrhages, preauricular lymphadenopathy and swollen lids. Vision is unaffected. Photophobia is uncommon.

Treatment

Nonpharmacological

Avoid patching, use dark goggles, avoid close contact with other persons and swimming for 2 weeks. The doctor must wash his hands after examination of such patient and tonometer should be disinfected after use in such cases.

Pharmacological

It is usually a self limiting illness. Antiviral agent are not effective. Corticosteroids are contraindicated, however, are used if vision is threatened.

1. Antibiotic eye drops (as in mucopurulent conjunctivitis) prevent secondary infection.
2. Naphazoline 0.05% eye drops 1 drop 4 times a day or Zinc sulphate 0.125% eye drops 1 drop 4 times a day.

Patient should be referred to an ophthalmologist if there is no response in 7 to 10 days.

Patient education

- Not to share towels, handkerchief and other objects with other persons. Also patient's bottle of eye drops/ointments should not be used by other persons in the family.

References

1. Ophthalmic Drug Facts 2000. Facts and Comparisons: A Wolters Kliewer Company, St. Louis, Missouri.

2. In: Kanki JJ. Clinical Ophthalmology, 4th Edition, 1999. Butterworth Heinemann, Oxford.
3. Drugs used in Bacterial Infections: WHO Model Prescribing Information. World Health Organization, 2001.
4. WHO Bulletin: Conjunctivitis of the New Born 1986, pp 1-15.
5. Conjunctival and Corneal Pathology. In: Principles and Practice of Ophthalmology, 2nd Edition, 2000, Vol 1-6 WB Saunders Co. 2000, pp 3609-3634.
6. Chlamydial Disease. In: Principles and Practice of Ophthalmology, 2nd Edition, 2000. Vol 1-6 WB, Saunders Co. pp 4955-4960.

PAINFUL RED EYE

All painful red eye or visual loss should be referred immediately to a tertiary care level.

GLAUCOMA

Glaucoma is an optic neuropathy which manifests as typical visual fields defects (nerve fibre bundle defects), the aetiology of which is in some way related to intraocular pressure (IOP).

Salient features

- The classical triad of increased IOP, optic head cupping and visual field changes are always present and are sign of progress of the disease and are the bench mark for asssessing the response to therapy.
- The width of the angle of anterior chamber further differentiates the glaucoma into open and closed angle varieties.
- Treatment modalities differ according to the type of glaucoma.

Congenital glaucoma/ buphthalmos

Salient features

- IOP is usually normal as sclera in children distends leading to increased corneal diameter.
- Excessive tearing and photophobia.

Treatment

Pharmacological

The aim is to control IOP till definitive treatment i.e., surgery is performed.

1. Timolol drops 0.25% eye drops one drop instilled at 12 hourly interval

   Or

   Betaxolol 0.25% eye drops one drop instilled at 12 hourly interval.
2. Tab. Acetazolamide 12 mg/kg in 3-4 divided doses.

Surgical treatment at a tertiary care center includes goniotomy and trabeculotomy or trabeculotomy with trabeculectomy. Monitor corneal diameter, IOP, discharges and refraction periodically.

Secondary Childhood Glaucoma

It is secondary to certain developmental anomalies, which need to be treated alongwith the glaucoma

Patient education

- It is a slowly progressive disease, usually amenable to surgery. Regular follow up life long is must for early detection of any failure/ complications.
- Eye is vulnerable to trauma and thus contact sports may be restricted in these children.
- Screening of any child particularly the siblings who have a large cornea, photophobia or excessive watering of the eyes should be done.

Angle closure glaucoma - acute

The intraocular pressure is raised due to pupillary block.

Salient features

- Acute pain and blurring of vision along with headache and vomiting, in some cases.
- Chronic angle closure glaucoma ensues when repeated subacute attack lead to peripheral synechiae, zipping up of the angle, and persistent rise of IOP with subsequent optic atrophy.

Treatment (Acute phase)

Pharmacological

1. Inj. Mannitol 20%, 1.5-2 g/kg, IV infusion over half an hour.

   Or

   Glycerol 50%, 1 to 1.5 g/kg in 50% solution orally, mixed with cold lemon or orange juice in 3-4 divided doses.

   (**Caution:** Can cause hyperglycemia in diabetic patients. Do not drink water for 1 hour after ingesting, Contraindications include dehydration or cardiac decompensation).
2. Pilocarpine 2% eye drops every 15 min for 1 hour and thereafter 6 hourly started after IOP has been lowered by hyperosmotics as above.
3. Tab. Acetazolamide 500 mg stat followed by 250 mg every 6 hours and maintained till the definitive treatment of laser peripheral iridotomy relieves the pupillary block.

4. Timolol 0.5% eye drops 2 times a day (if pressure is still high) to be continued till surgery.

   Or

   Betaxolol 0.5% eye drops 2 times a day (Preferred in asthmatics and patients with cardiac conduction defects).

   (**CAUTION:** All mydriatics/cycloplegic drugs which dilate pupils are contraindicated)

Once the IOP falls to early 20's by the treatment listed above- usually in a day or so evaluate and perform gonioscopy, disc cupping and visual field charting. Definitive treatment is iridotomy by laser or surgical depending on the facilities available. Prophylactic laser peripheral iridotomy should be performed on the fellow eyes as soon as possible. IOP is the most significant and titrable response. The disease can recur after a successful iridotomy so the patient should be under follow up at 6 monthly intervals at least.

Patient education

- Do not ignore headache and chronic ache in the eyes and report to the eye specialist if coloured halos around light appear.
- Pilocarpine can induce myopia, increase inflammation and cause accommodative spasm in the young patient and the miosis in an older patient who has concomitant cataract leading to diminished vision.
- Topical beta-blockers need to be used with caution in chronic obstructive pulmonary disease, myasthenia gravis, cardiac arrhythmia's, diabetes mellitus etc.

Angle closure glaucoma- chronic

The IOP is raised due to progressive angle closure or by repeated intermittent subacute attacks secondary to pupillary block. Commonly asymptomatic until significant visual loss has occurred. The presentation is thus more akin to open angle glaucoma.

Treatment

Pharmacological

1. Timolol 0.5% or Betaxolol 0.5% eye drops 2 times a day usually required lifelong.
2. Pilocarpine 2-4% eye drops 4 times a day usually required for life Laser or surgical iridotomy is done to eliminate any element of pupillary block.

If the glaucoma is still uncontrolled on maximal tolerable medical therapy (i.e. 2 topical antiglaucoma medications), then glaucoma filtering surgery or trabeculectomy should be performed.

Patient education

- Since the disease is asymptomatic, patients who complain of nonspecific headache or eye ache should not be ignored.

Primary open angle glaucoma

Salient features

- The IOP is usually above 21 mmHg with associated nerve head cupping and visual fields defects.
- Usually asymptomatic, however, some complain of frequent change in spectacles and mild ache of the eyes.
- Gonioscopically the angle of AC (anterior chamber) is widely open.

Treatment

Pharmacological

1. Timolol 0.5% Or Betaxolol 0.5% eye drops 1 drop 12 hourly and the morning dose should be as early upon waking usually.

   Or

   Pilocarpine 1-4% eye drops 3 times a day or 4% gel once at bedtime. If initial therapy fails, refer to a higher center and substitute with another agent preferably belonging to a different group.

   Latanoprost 0.005% eye drops given only once at bedtime. (**CAUTION:** Maintain constant cold chain)

   Or

   Dipivefrine hydrochloride 0.1% eye drops, 2 to 3 times a day.

   Or

   Dorzolamide 2% eye drops 2 to 3 times a day.

If patient is not controlled on 2 topical drugs then consider alternative treatment with either laser trabeculoplasty or glaucoma filtering surgery. Ideally all parameters- IOP, nerve head and visual field assessment should be conducted at 3-6 monthly interval.

Patient education

- Pilocarpine can cause accommodative spasm and induce myopia leading to browache and a need to readjust reading spectacles of patient.
- Avoid instillation of more than one drop of the drug or double doses in case morning dose is missed.
- Most drugs especially beta-blockers cause burning and stinging sensation on instillation. Chronic use can lead to dry eyes and tear supplements may need to be given.
- Punctual occlusion i.e. pressing medial end of lower lid to increase

drug and cornea contact time should be explained to patients

- In diabetics the use of timolol eye drops can mask the warning symptoms of hypoglycemia.
- Avoid sedentary life-style.
- High risk individuals i.e., high myopia, large cups more than 0.5:1 or asymmetry in cups of more than 0.2 or any person with a positive family history of glaucoma, or aged >35 years should routinely get his intraocular eye pressures and fundus evaluated on an annual basis.

Lens induced glaucoma

It occurs secondary to the cataractous lens either by leakage of lens protein or by lens intumescence. In addition to medically lowering the IOP the cataractous lens needs to be removed, under steroid cover to suppress the inflammatory element.

References

1. Improving the therapeutic index of Topically Applied Ocular Drugs. Arch Ophthalmol 184; 102: pp 551.
2. Long term drift and continued efficacy after multi-year Timolol therapy. Arch Ophthalmol 181; 99: pp 100.
3. Mosby's Ocular Drug Handbook 1996. Mosby Year Book Inc., Missouri, pp 52-59.
4. Pavan-Langston D. Manual of ocular diagnosis and therapy. 4th edition Little Brown Company 1996, pp 229-269.
5. Kanski JJ. Clinical Ophthalmology, 4th edition, 1999, Butterwoth Heinemann, pp 183-260.

CONJUNCTIVAL ALLERGIC DISORDERS

Conjunctival allergic disorders include acute allergic conjunctivitis (Hay fever conjunctivitis - seasonal allergic conjunctivitis, perennial allergic conjunctivitis), atopic keratoconjunctivitis, vernal keratoconjunctivitis, giant papillary conjunctivitis, phlyctenular keratoconjunctivitis, conjunctivitis medicamentosa etc.

Acute allergic conjunctivitis (Hay fever conjunctivitis)

It is a recurrent, bilateral type I, IgE mediated hypersensitivity to a variety of exogenous air borne allergens such as pollens, animal dander, dust, moulds etc. and may be seasonal, perennial, (chronic) or acute type.

Treatment

Nonpharmacological

Avoidance of allergen or minimize exposure to allergen, if possible dilution of allergen and washing away by instillation of tear substitutes and cold compresses to the eye.

Pharmacological

1. Topical combination of antihistamine (Antazoline 0.5% or Pheniramine) and vasoconstrictor (Naphazoline hydrochloride 0.05%) eye drops 4 times a day till the resolution of symptoms.
2. Disodium cromoglycate 4% eye drops 4 times a day till resolution of symptoms.

   Or

   Ketorolac tromethamine 0.5% eye drops 4 times a day till resolution of symptoms.

   (**CAUTION:** Topical corticosteroids are contraindicated as a first line therapy. If required should only be administered by an ophthalmologist)
3. If severe systemic antihistaminics should be administered

   Tab. Cetrizine hydrochloride 10 mg once a day for duration of acute symptoms.

   In children 5 mg once a day.

Patient education

- Symptomatic therapy and avoidance of allergen as far as possible is the mainstay of the therapy.
- Minimum use of topical eye drops should be advocated.

Phlyctenular keratoconjunctivitis

It is characterized by presence of red nodule at bulbar conjunctiva, most often at nasal limbus of one eye. It is a cell mediated type (type IV) conjunctival hypersensitivity to tuberculoprotein, the commonest endogenous allergen and others include staphylococcal antigens, worm infestations, fungal antigens and idiopathic etc.

Treatment

Topical Treatment

1. Dexamethasone 0.1% eye drops or Betamethasone 0.1% eye drops combined with antibiotic Neomycin 0.5%, or Chloromycetin 0.5% eye drops 4 times a day for 7 days.
2. If cornea is involved (see section on corneal ulcer).
3. Rule out any systemic cause and treat accordingly, especially if recurrent or bilateral keratoconjunctivitis.

Spring catarrh (Vernal keratoconjunctivitis)

It is a bilateral, recurrent papillary conjunctivitis occurring in a warm climate due to hypersensitivity to exogenous allergens.

Salient features

- Itching, ropy discharge, gelatinous secretions at limbus and papillae (cobblestones) in upper palpebral conjunctiva.

Treatment

Nonpharmacological

Avoidance of allergen and wind, rubbing of eye, tear substitutes (barrier function, dilute allergen, wash away allergen); Wear glasses or goggles. Air conditioning with appropriate filters.

Pharmacological

In mild cases

1. Topical antihistamine + vasoconstrictor combinations. Boric acid 1.25%; Naphazoline 0.05%; Zinc sulphate 0.12%; Antazoline hydrochloride 0.5%, Chlorpheniramine 0.01% 4 times a day.
2. Disodium cromoglycate 4% eye drops 4 times a day.

Or

Ketorolac tromethamine 0.5% Or Ketotifen eye drops 4 times a day

In acute attacks and severe cases not resolving with above treatment, refer to an ophthalmologist for treatment with following:

Prednisolone sodium phosphate 1% Or Dexamethasone 0.1% or Betamethasone 0.1% four times a day for 2 days, twice daily for four days, once daily for next 3 days and then discontinue.

(**CAUTION**: Should be given under the close supervision of an ophthalmologist).

Patient education

- Long term use of a steroid may cause glaucoma and cataract.

References

1. Ophthalmic Drug Facts, 2000. A Wolters Kliever Company, St. Louis, Missouri.
2. Clinical Ophthalmology, 4th edition, 1999, Butterworth Heinemann, Oxford.
3. Manual of Ocular Infection and Therapy, 4th edition,1996, Little Brown Co.

CORNEAL ULCER (ULCERATIVE KERATITIS)

Corneal ulcer may be classified as: (i) bacterial corneal ulcer, (ii) fungal corneal ulcer (mycotic keratitis), (iii) viral corneal ulcer (herpetic keratitis), (iv) Acanthamoeba keratitis. Corneal ulcers frequently occur in the eyes with some predisposing factors.

Salient features

- Pain, redness, excessive tearing, photophobia, sticky discharge, swollen lids & blurred vision, blepharospasm, ciliary congestion, corneal haziness, infiltration of cornea, ulcer/abscess in the cornea.
- Decreased corneal sensitivity, hypopyon, iritis, secondary glaucoma and superficial corneal vascularization. Corneal ulcer is stained green on staining with fluoroscein 2%.
- Complications: corneal thinning, ectasia, descematocele, secondary glaucoma, perforation and its sequelae including endophthalmitis or panophthalmitis and loss of eye.

Treatment (To be managed by an ophthalmologist)

Perform corneal scrapings from the base and edges of the ulcer to make smears for Gram and Giemsa stains and culture and sensitivity testing. Initiate therapy based on clinical picture and findings obtained on smears of corneal scrapings. As a first line therapy broad spectrum antibiotics are started in all cases. Antifungal agents are given if confirmed by scrapings or in case of strong clinical suspicion. The treatment is modified according to the clinical response and result of culture and sensitivity of microorganisms.

A. Bacterial corneal ulcer

Nonpharmacological

- Avoid patching.
- Maintain proper ocular hygiene by regular cleaning of discharge twice a day.
- Removal of contributory factors e.g. trichiasis, foreign body, entropion, dacryocystitis etc.
- Removal of necrotic tissue increases efficacy of antibiotics.
- Prevention and treatment of complications - secondary glaucoma should be detected and treated adequately.

Pharmacological

Start empirical therapy and refer to an ophthalmologist

1. Cefazolin 5%eye drops(50 mg/ml) [mix 5 ml of distilled water in 250 mg of Cefazolin] solution instilled 1 drop every 30 minutes or 1 hourly round the clock for at least 24 hours.
2. Topical fortified Gentamicin 14 mg/ml (1.4%), [mix 2 ml 80 mg injectable solution of Gentamicin in one vial of commercially available 0.3% 4 ml Gentamicin eye drop solution (prepared fresh)] instill 1 drop every 1/2- 1 hour for first 24 hours.

Frequency of administration is reduced according to the response and continued for 2-3 weeks.

If compliance with frequency of topical instillation as above is not possible

1. Cefazolin 100 mg subconjunctival injection after anaesthetizing the conjunctiva (if required).
2. Subconjunctival Gentamicin 20 mg if compliance to topical drops is unreliable

   Or

   Fortified Tobramycin 14 mg/ml solution may be used in place of Gentamicin.
3. Ciprofloxacin or Ofloxacin 0.3%eye drops every 2 hours.
4. Atropine sulfate 1% eye ointment to be applied 2 or 3 times per day.

Definitive therapy is started based on the culture and sensitivity of microorganisms. Parenteral antibiotics are indicated in perforated corneal ulcer, impending perforations, corneal ulcer following perforating injury and infections caused by *Neisseria* or *Hemophilus* microorganisms.

(**CAUTION**: Corticosteroids are contraindicated)

If associated with secondary glaucoma (see section on glaucoma).

B. Fungal corneal ulcer (Mycotic keratitis)

Mycotic keratitis usually develops 2-3 weeks following corneal injury with an organic or vegetative matter. The common fungi causing fungal keratitis in order of frequency are *Fusarium, Aspergillus, Candida* and *Curvularia*.

Salient features

- Severe signs, less symptoms, dry rough or cheesy appearance with feathery margins, satellite lesions, immune ring, endothelial plaque, thick immobile infected hypopyon.

Treatment

1. Regular debridement of the necrotic tissue.
2. Cauterization of the edges with Trichloroacetic acid/povidone iodine under topical anaesthesia (preferably under the supervision of an ophthalmologist).
3. Natamycin 5% suspension 1 to 2 hourly.

   And/or
4. Fluconazole 1% eye drops 1 hourly round the clock.

   In case of no response within 48 hours substitute fluconazole with Amphotericin B.

Amphotericin B 0.15 to 0.25% formulation prepared in distilled water,

every 15 to 30 minutes for 24-48 hours then 1-2 hourly continued for 2-3 weeks or till resolution of keratitis.
In case of immunocompromised patients, spreading ulcer, perforation or impending perforation,
Cap. Ketoconazole 200-400 mg 2 times a day for 2-3 weeks.
Or
Cap. Fluconazole 200 mg 2 times a day for 2-3 weeks.
Since superadded bacterial infection is common,
Ciprofoxacin or Tobramycin eye drops (see section on bacterial conjunctivitis).

C. Viral corneal ulcer (*Herpes simplex* keratitis)

It is characterized by unilateral or bilateral recurrent attacks of keratitis in the form of infections epithelial keratitis, stromal keratitis, or endothelialitis etc. The attack is often precipitated by trivial trauma, fever, cold, emotional stress, menstruation etc.

Treatment (Epithelial keratitis)

1. Acyclovir eye ointment 3% five times a day for 2-3 weeks.
   Or
   Idoxuridine (IDU) 0.1% eye drops 1 hourly in day time and IDU ointment 0.5% at bed time for 7 days or till definite improvement occurs then (IDU) drops 2 hourly in day and ointment at night for 2-3 weeks till resolution.
2. Topical Cycloplegics - Homatropine 2%eye drops 2 times a day.
3. Broad spectrum antibiotic as in the treatment of mucopurulent conjunctivitis till ulcer heals.
   Refer to an ophthalmologist
   If more than two recurrences occur,
   Tab. Acyclovir 400 mg 2 times a day for 3-6 months

References

1. Ophthalmic Drug Facts 2000. Facts and Comparisons. A Wolterss Kliewer Company, St Louis, Missouri.
2. Clinical Ophthalmology, 4th Edition,1999. Butterwoth Heinemann, pp 183-260.
3. Allergic and toxic reactions.In: Principles and Practice of Ophthalmology, Vol 1-6, 2nd Edition,2000, WB Saunders Co, pp 781-803.
4. Manual of Ocular Infection and Therapy. 4th Edition,1996, Little Brown hhhhjjjCo, pp 781-803.

Treatment (Stromal keratitis)

Nonpharmacological

Dark glasses and use of artificial tears with UV filter.

Pharmacological

1. Moderate to severe disease

Dexamethasone 0.1% or Prednisolone 1% eye drops every 3 hours tapered gradually on the basis of clinical response. For milder disease lower concentration of 0.12% Prednisolone Or 1: 100 dilution Dexamethasone 0.1% eye drops 4 times a day, tapered slowly to once daily or once a week before stopping.

2. Prophylactic Acyclovir eye ointment 2 times a day.
3. Homatropine 2% eye drops 1 drop 2 times a day.
   (**CAUTION**: Avoid corticosteroids in presence of epithelial ulceration; 1% Medroxyprogesterone may be used)

Patient education

- To report an ophthalmologist in every case of eye redness, pain or diminution of vision. Regular follow up at 6 monthly intervals since viral keratitis is known to recur.

References

1. Viral diseases of the cornea and External Eye. In: Principles and Practice of Ophthalmology, Vol 1-6, 2nd Edition, 2000, WB Saunders Co, pp 846-893.

SENILE CATARACT

While cataract refers to the age related opacification of crystalline lens, the exact cause of senile cataract is not known.

Salient features

- Gradual painless progressive diminution of vision in one or both eyes.
- Excessive glare, monocular diplopia or polyopia, coloured halos around lights, diurnal variation in vision, change in colour values and fixed black spots before eyes.
- Ocular examination reveals greyish white or whitish lenticular opacity on torch light examinations depending on the stage of cataractogenesis i.e. immature, mature or hypermature. Detailed evaluation of cataract changes and fundus examination is done after dilating the pupils using distant direct ophthalmoscopy, slit lamp examination, direct ophthalmoscopy etc.

Treatment

Pharmacological

Till date no proven drug treatment exists to delay, prevent or reverse the development of senile cataract. Definitive treatment of senile cataract is

lens extraction. Indications of lens extraction are visual handicap, interference in patient activities due to poor vision or glare disability even if cataract is immature. In mature, hypermature cataract urgent lens extraction is done to prevent further complications such as glaucoma, iritis, or displacement of lens.

Optical treatment

- In early cataract decreased vision may be improved by accurate refraction and prescribing corrective spectacles.
- Pupillary dilatation by instillation of 2.5% Phenylephrine eye drops, or Tropicamide 0.5% eye drops or Cyclopentolate 1% eye drops in the morning may provide visual improvement in patient with minimal lenticular opacities in the axial area.
  (**CAUTION**: Dilatation of pupil is contraindicated in patients with shallow anterior chamber).

The choice of the procedure depends on the patient, the type of cataract, the availability of proper instruments and equipments and the degree of which the surgeon is comfortable and proficient in performing standard Extra Capsular Cataract extraction (ECCE), phacoemulsification or non-phaco small incision surgery. Posterior chamber intraocular lens placed inside the capsular bag is the preferred modality.

Patient education

- Do not wait for maturation of cataract for undergoing cataract operation.
- Secondary glaucoma and other complications may develop if total cataract remains unoperated for a long time.
- Visual rehabilitation in the early postoperative period is faster in small incision cataract surgery
- Laser is not used for cataract surgery as such, however, Nd:YAG laser is used for posterior capsulotomy which is required in a large percent of intra ocular lens patients.

References

1. Preoperative Evaluation of the Cataract Patient. In: Principles and Practice of Ophthalmology,Vol 1-6, 2nd Edition,2000, WB Saunders Co, pp 1477-1486.
2. Extracapsular Cataract Extraction. In: Principles and Practice of Ophthalmology, Vol 1-6 2nd Edition,2000, WB Saunders Co, pp 1486-1500.
3. Phacoemulsification. In: Principles and Practice of Ophthalmology, Vol 1-6,2nd Edition,2000, WB Saunders Co, pp 1500-1514.

REFRACTIVE ERRORS

Refractive errors (ametropia) are the optical defects of eye in which the parallel rays of light entering the eye do not come to focus on the fovea centralis. Ametropia includes myopia, hypermetropia and astigmatism. Astigmatism may be combined with myopia or hypermetropia.

Salient features

Refractive errors are characterized by blurred vision, subnormal vision, eye strain or asthenopia, headache, tearing, latent or manifest strabismus etc.

Treatment

Pharmacological

No pharmacological treatment is available for ametropia.

Surgical

- Accurate retinoscopy and corrective spectacles or contact lenses.
- Keratorefractive surgery.

Patient education

- Young patients opting for laser correction should wait till the refraction is stable for at least one year.

References

1. Optics of Prescribing Spectacles. In: Principles and Practice of Ophthalmology, Vol 1-6,2nd Edition, 2000, WB Saunders Co, pp 5345-5341.

STRABISMUS (SQUINT)

Any child presenting with strabismus should have the following conditions ruled out:

- Refractive error - refraction should be done under full cycloplegia i.e. Atropine Ointment 1% 3 times a day for 3 days prior to performing retinoscopy. If any refractive error is present, that should be fully corrected by spectacles for at least 3-6 months, before performing definitive surgical therapy for strabismus.
- Any opacity in the media e.g. cataract, corneal opacity, retinoblastoma etc.
- Amblyopia element whether induced by strabismus or vice versa should be treated with occlusion therapy or other modality before treating the strabismus.

Treatment

Nonpharmacological

Correct the refractive error or associated cataract, corneal opacity etc.
Fusion exercises for intermittent exotropia and other orthoptic exercises.

Surgical

Definitive therapy is surgical realignment of axis once other associated features have been treated.

Patient education

- Functional improvement in strabismus is best between 3-5 years of age.
- It is a misconception that squint is spontaneously corrected as the child grows, therefore, do not delay the treatment of strabismus.

Reference

1. Strabismus in Childhood. In: Principles and Practice of Ophthalmology, Vol 1-6, 2nd Edition,2000, WB Saunders Co, pp 4358-4366.

IRIDOCYCLITIS (ANTERIOR UVEITIS)

Uveitis is defined as inflammation of uveal tract i.e. iris, ciliary body and choroid. Inflammation of iris and ciliary body constitutes iridocyclitis or anterior uveitis.

Salient features

- Acute anterior uveitis is characterized by painful red eye, diffuse periorbital pain, photophobia, blurred vision, excessive tearing. There is no purulent or mucopurulent discharge.
- Ocular examination reveals ciliary injection, normal or deep anterior chamber, small irregular pupil, posterior synechia, media opacities, tenderness of eyeball and variable decrease in vision.
- Slit lamp biomicroscopy is essential for diagnosis and monitoring the treatment. Slit lamp examination in active cases, reveals marked flare and cells in anterior chamber and fine keratic precipitates at the back of cornea. Posterior segment involvement and changes in intraocular pressure may occur in anterior uveitis.

Treatment (Refer immediately to an ophthalmologist)

Nonpharmacological

Dark glasses.

Pharmacological

1. Dexamethasone 0.1% eye drops Or Betamethasone 0.1% eye drops Or Prednisolone sodium phosphate 1% eye drops Or Prednisolone acetate 1% eye drops. 1-2 hourly, tapered gradually on the basis of slit lamp evidence of anterior chamber activity.
2. Homatropine hydrobromide 2% eye drop solution.
   Or
   Atropine sulphate 1% eye ointment once or twice a day.
3. If no response (within 7 days), severe anterior uveitis, bilateral involvement and panuveitis.
   Tab. Prednisolone 1 mg/kg or 40 - 80 mg per day orally every morning breakfast or on alternate day. Gradually taper depending upon satisfactory clinical response over 2 to 4 week period.
4. If no response within 1 week or non-compliant, posterior uveitis or severe uveitis
   Periocular corticosteroids - Subconjunctival or posterior subtenon injection (preferred).
   Methylprednisolone acetate - 20, 40, 80 mg/ml Or Triamcinolone acetonide (10, 40 mg/ml) 0.5 ml - 1.0 ml
   (Contraindication - Infectious uveitis e.g. herpetic or toxoplasmosis, known steroid responder, patients with glaucoma or elevated intra ocular pressure.)
5. Close monitoring of intraocular pressure and treat appropriately if elevated - Timolol maleate 0.5% eye drops 2 times a day and/or Acetazolamide 250 mg 4 times a day 6 hourly.
6. Tab. Ibuprofen 400 mg 3 times a day.
7. Identify the specific cause and give specific therapy (syphilis, tuberculosis, herpes simplex, herpes zoster, toxoplasmosis etc.)
8. Surgical treatment - surgical treatment is required for various complications of anterior uveitis.

Patient education

- Recurrent/chronic nature of the disease which may interfere with vision should be explained.
- Patients with history of uveitis, juvenile rheumatic arthritis, ankylosing spondylitis should be instructed to report immediately to an ophthalmologist even if there is mild diminution of vision.
- Recurrent episodes of anterior uveitis and subsequent therapy may lead to various complications particularly complicated cataract and steroid induced glaucoma.
- Possible side effects or toxic effects of long term topical periocular and systemic corticosteroid therapy should be explained.

References

1. The Cornea, Uveitis and Intraocular Neoplasms. In: Gowerbed Pub. London, 1992 pp 3-38.

ORBITAL CELLULITIS

Suppurative inflammation of adipose and soft tissues of orbit is termed as orbital cellulitis. It occurs more frequently in children than adults. Spread of infection from paranasal sinuses, particularly ethmoid sinus is the commonest cause. Other causes include extension of infection from dental abscess, ear infection, face and lid infection, panophthalmitis, dacryocystitis, dacryoadenitis, postoperative to any facial or ocular surgery, perforating injury and haematogenous spread etc.

Salient features

- Marked unilateral axial irreducible proptosis, restricted and painful ocular motility, lid edema, chemosis of conjunctiva, constitutional symptoms such as fever, headache, nausea, vomiting, malaise, prostration.

Treatment (Refer immediately to an ophthalmologist)

Nonpharmacological

Warm compresses.

Pharmacological

Severe cases (treatment in the hospital)

1. Cap Amoxycillin plus Cloxacillin 500 mg in 3 divided doses for 10-14 days.

   Or

   Cap Amoxycillin plus Clavulanic acid (375 mg) every 8 hours.
2. Inj. Gentamicin 5 mg/kg in 2 divided doses for 7-10 days.

   Or

   Inj. Cefotaxime 1-2 g in 10 ml sterile water for injection over a period of 3-5 min every 12 hours.

   In Neonates - 100-150 mg/kg in 2-3 divided doses; in Infants and children - 50-180 mg/kg/day in 4-6 divided doses.

   Antibiotics are changed according to the report of culture and sensitivity and continue till resolution occurs.
3. For anaerobic infections

   Inj. Metronidazole 500 mg IV infusion 8 hourly, shifted to oral dose of 400 mg 8 hourly based on the clinical response for 2 weeks.

4. Oxymetazoline 0.05% nasal drops 2-3 drops in each nostril 2 times a day, in children: 0.025%.
5. Symptomatic therapy for pain : antipyretics and analgesics in usual doses.
6. Lubricating eye drops/artificial tears : 1-2 hourly or antibiotic eye ointment 5 times a day to prevent exposure keratopathy.

Surgical Treatment

Surgical drainage is indicated if orbital abscess forms based on clinical features, USG and CT Scan findings; poor response or no response to the IV antibiotic therapy, or if there is a threat to ocular function.

- Tarsorrhaphy or Frost suture to prevent exposure keratopathy.
- Sinusotomy/Craniotomy for pus in paranasal sinus or brain abscess respectively.
- All the patients must be carefully monitored for vision, fundus, corneal exposure, ocular motility, pupillary reaction, corneal sensations, proptosis, systemic status including CNS function.

Patient education

- Any ear, sinus or dental infection especially in children should be treated promptly.
- Any child presenting with unexplained lid oedema or cellulitis should be immediately referred to an ophthalmologist.

References

1. Conjunctivitis and Orbital Cellulitis in Childhood. In: Principles and Practice of Ophthalmology, Vol 1-6, 2nd edition, 2000, WB Saunders Co, pp 4474-4482.

ENDOPHTHALMITIS

Endophthalmitis is of two types: (1) exogenous endophthalmitis caused by the direct inoculation of infecting agent through the breach in the continuity of ocular coats e.g. postoperative, post-traumatic, (2) endogenous endophthalmitis results due to haematogenous spread of infective agents. Depending upon the aetiology of infectious agents both these categories may be bacterial or fungal.

Salient features

- History of eye surgery, penetrating injury, fever, infection or predisposing systemic diseases leading to metastatic endophthalmitis
- Marked visual loss, ocular pain, headache, ocular discharge, photophobia, intense redness and lid swelling.

- Ocular examination reveals conjunctival and ciliary infection, profound decrease in vision even up to perception of light with accurate or inaccurate projection of rays. Corneal edema, hypopyon, signs of uveitis, reduction in intraocular pressure, exudation in vitreous leading to reduced or absent fundus reflex are the other associated features. The clinical picture is variable depending upon the route of entry, infectious process and duration of disease.

Treatment (Refer immediately to an ophthalmologist)

Postoperative bacterial endophthalmitis

Pharmacological

1. Intravitreal injection of antibiotics - (i) Inj. Vancomycin hydrochloride 1 mg in 0.1 ml plus Inj. Ceftazidime 2 mg in 0.1 ml or Inj. Amikacin sulfate 0.4 mg in 0.1 ml.
2. Subconjunctival injection Vancomycin 25 mg/0.5 ml plus Ceftazidime 100 mg/0.5 ml plus Dexamethasone 0.25 mg/0.5 ml.
3. Vancomycin eye drops 50 mg/ml plus Amikacin eye drops 15 mg/ml 1 drop every 6 hours.
4 Homatropine 2% eye drops 3 times a day or Atropine 1% eye ointment 2 times a day.
5. Prednisolone acetate 1% eye drops or Dexamethasone or Betamethasone 0.1% eye drops every 6 hours.
6. Tab. Prednisolone 1 mg/kg/day in a single morning dose after 24 hours of antibiotic use and continue for 10-14 days 2 times a day for 5-10 days.
7. Parenteral antibiotics are given only as a supportive therapy.

Surgical treatment

Vitrectomy - Pars plana vitrectomy is indicated if visual activity is limited to light perception or if there is poor response to above treatment in 30-36 hours. Vitrectomy may also be required in the resolved phase of endophthalmitis for vitreous opacification/membranes.

Treatment (Traumatic endophthalmitis)

Hospitalize the patient and give immunization for tetanus.

Inj. Vancomycin 1 g IV infused over 1 hour, 12 hourly.

1. Inj. Gentamicin 2 mg/kg every 12 hour.

Or

Inj. Ceftazidime 2 g IV every 12 hour.

Or

Inj. Ceftriaxone 2 g IV/day.

2. Clindamycin should be considered in all cases until *B. cereus* infection has been excluded.
   Inj. Clindamycin 600-900 mg IV every 8 hour.
   In children 20-40 mg/kg/day IV 6-8 hourly.
   Continue antibiotics for 7-10 days.
3. Topical fortified eye drops, subconjunctival injection and intravitreal injection and cycloplegic drops as in cases of postoperative bacterial, endophthalmitis.

Surgical treatment

- Repair the ruptured eyeball at the earliest.
- Pars plana vitrectomy - indications are similar to that of postoperative bacterial endophthalmitis.

Fungal endophthalmitis

Exogenous fungal infections may occur postoperatively or secondary to trauma. Endogenous bacterial endophthalmitis should be treated as an emergency treatment.

Treatment

Pharmacological

1. Vitrectomy to debulk the vitreous of fungi.
2. Intravitreal Amphotericin B 5-10 mcg/0.1 ml or Fluconazole 25 mcg/ 0.1 ml.
3. Inj. Amphotericin B 0.5-1.5 mg/kg/day IV slow infusion over 2-6 hours. (50 mg vial in powder form and is dissolved in 5% dextrose) for 10-14 days.

   Or

   Tab. Fluconazole 400 mg loading dose followed by 200 mg daily, total dose should not exceed 600 mg/day.
   In children 12 mg/kg loading dose followed by 6 mg/kg/day.

   Or

   Tab. Ketoconazole 200 mg orally 2 times a day or daily. In children above 2 years of age 3.3-6.6 mg/kg/day.
4. Homatropine 2% eye drops 4 times a day or Atropine 1% eye ointment 2 times a day.

Patient education

- All patients with open globe injury must contact the ophthalmologist after getting initial treatment.

- Cataract operated cases should never ignore the pain, tearing & photophobia and decrease in vision in the operated eye and must consult the ophthalmologist at the earliest.

References

1. Endophthalmitis Vitrectomy Study Group: Results of tthe endophthalmitis vitrectomy. Arch Ophthalmol 1995; 113:1479-1496.
2. Fungal Infections and the Eye. In: Principles and Practice of Ophthalmology, 2nd ed. Vol 1-6, WB Saunders Co. 2000, pp 4884-4917.

OPTIC NEURITIS

Optic neuritis includes papillitis (inflammation of optic disc), retrobulbar neuritis (inflammation of retroorbital portion of optic nerve) and neuroretinitis when optic disc and retina both are inflamed. The chief causes of optic neuritis are: demyelinating diseases (usually multiple sclerosis), systemic viral/bacterial infections, autoimmune diseases and secondary to ocular inflammations e.g. uveitis, endophthalmitis, orbital cellulitis etc. MRI of the brain to detect multiple white matter lesions should be done for diagnostic and therapeutic purposes.

Salient features

- Unilateral or bilateral, sudden severe visual loss, ipsilateral eye pain markedly impaired colour vision, visual obscurations in bright light and episodic transient visual obscuration on physical exertion, hot bath, hot weather, fatigue etc. Profound decrease in visual acuity, dyschromatopsia, central or paracentral scotoma, tenderness of the globe near superior rectus insertion and reduced visually evoked response.
- Marked abnormality in pupillary response to light reflex (sluggish or afferent pupil defect).
- Fundus examination reveals optic disc edema with or without flame shaped retinal haemorrhages in papillitis and neuroretinitis and a normal fundus in retrobulbar neuritis.

Treatment (Refer immediately to an ophthalmologist)

Usually does not respond to pharmacological therapy, very often some recovery of vision occurs spontaneously after weeks or months. However, proven case of multiple sclerosis may benefit with following:

Inj. Methyl prednisolone 1 g/day (or 15 mg/kg/day) IV in 2-4 divided doses for 3 days followed by Tab. Prednisolone 1 mg/kg/day orally for 11 days,

taper to tab prednisolone 20 mg on day 12 and then 10 mg/day on day 13 and 15.
In case of proven infective aetiology administer appropriate systemic antibiotic to eliminate the focus of infection.
(CAUTION: Oral prednisolone alone is not recommended).

Patient education

- Explain recurrent nature of disease and permanent visual loss can occur.
- Risk of developing multiple sclerosis.
- Avoid the factors provoking transient visual obscurations like physical exertion, hot bath, hot weather, stress, anxiety, anger etc.

References

1. Ophthalmic Drug Facts, 2000. Facts and Comparisons. A Wolters Kliever Company, St Louis, Missouri.
2. Kanski JJ. Clinical Ophthalmology, 4th edition, 1999. Butterworth Heinemann, Oxford.
3. Pawar Langshan D. In: Manual of Ocular Infection and Therapy, 4th ed. Little Brown Co., 1996.
4. Optics neuritis. In: Principles and Practice of Ophthalmology, 2nd ed, Vol 1-6, WB Saunders Co. 2000, pp 4117-4137.

DIABETIC RETINOPATHY

Diabetic retinopathy (DR) is the microangiopathy of retinal vasculature occurring in long standing diabetes mellitus. It is classified into nonproliferative DR and proliferative DR; diabetic macular edema may be present at any of these stages.

Treatment

Nonpharmacological

Early diagnosis, proper diabetic control, careful follow up, fundus photography, fluoroscein angiography and timely laser photocoagulation or vitrectomy surgery or both.

Pharmacological

No time tested and proven pharmacological treatment exists which can delay, prevent or cure diabetic retinopathy.

Patient education

- Explain the importance of yearly fundus examination.
- Laser treatment can prevent deterioration of vision but cannot correct existing visual deficit.

References

1. Diagnosis, Management and Treatment of Nonproliferative Diabetic Retinopathy and Macular Edema. In: Principles and Practice of Ophthalmology, 2nd ed, Vol 1-6, WB Saunders Co. 2000, pp 1900-1914.

RETINAL DETACHMENT (RD)

Retinal detachment is defined as separation of the sensory retina from retinal pigment epithelium. It may be localized or entire retina may be involved. Retinal detachment involving macula results in profound visual loss. Retinal detachments are of three types, (i) rhegmatogenous RD, (ii) exudative RD and (iii) tractional RD.

Salient features

- Rhegmatogenous RD is caused by formation of a hole/tear in the retina. Clinical features include symptoms of flashes of light, sudden shower of black spots and veiled visions, loss of central vision if macula also detached. The diagnosis is made by examination of fundus by distant direct ophthalmoscopy, direct and indirect ophthalmoscopy. The detached retina appears grey with oscillating folds.
- Tractional RD is caused by gliotic bands on retina.
- Exudative RD is caused by collection of serous fluid between neurosensory retina and retinal pigment epithelium.

Treatment (To be treated by an ophthalmologist)

Pharmacological

There is no pharmacological therapy, which can prevent delay or cure rhegmatogenous (RD).

Exudative RD due to inflammatory conditions such as panuveitis (VKH syndrome, sympathetic ophthalmitis) or posterior scleritis is treated with systemic corticosteroid and/or pulsed methyl prednisolone therapy as described in the treatment of uveitis and optic neuritis. The cases which are refractory to corticosteroids or if serious steroid induced complications develop, should be treated by immunosuppressive therapy for which they should be referred to a tertiary care hospital.

Surgical treatment for Rhegmatogenous RD.

Treatment of choice is reattachment surgery involving:

Sealing of retinal break by creating aseptic chorioretinitis using cryotherapy or laser photocoagulation,

And/or

Scleral buckling.

Or

Vitreoretinal surgery with internal tamponade using gases or silicone oil.

Patient education

- Patients with high myopia, family history of RD, post cataract surgery, past episodes of chorioretinal inflammation should be warned of the premonitory signs of impending RD (sudden onset of floaters, flashes of light and sudden obscuration of one field of vision). In such cases they should immediately undergo a dilated fundus examination by indirect ophthalmoscopy by an ophthalmologist.
- Explain these patients not to indulge in contact sports.

References

1. Retinal Detachment. In: Principles and Practice of Ophthalmology, 2nd Edition, Vol 1-6, WB Saunders Co. 2000, pp 2352-2358.

14
SKIN CONDITIONS

BACTERIAL SKIN INFECTIONS

Superficial bacterial infections of the skin caused by pus producing organisms are called pyodermas. These are classified as primary and secondary pyoderma and common infective organisms are *Staphylococcus aureus* and *Streptococci*.

Salient features

- Superficial Infections can involve the skin or the hair follicle and as impetigo contagiosa, bullous impetigo and ecthyma.
- Impetigo is a highly contagious superficial pyoderma common in infants and small children, glomerulonephritis can occur as a complication.
- Hair follicle involvement can lead to folliculitis, furunculosis or carbuncle formation. Clinically, a suppurative lesion of a hair follicle can be observed. A group of adjacent furuncles with subcutaneous involvement and multiple discharging sinuses is seen in a carbuncle.
- Invasive infection presents as erythematous indurated well-defined plaque with raised edge or frank cellulitis with constitutional symptoms and regional lymphadenopathy.

Treatment

Nonpharmacological

Look for immuno-compromising factors and rule out endocrine disease like diabetes mellitus.

Advise for proper hygiene and nutrition. Advise on removal of dirt, crusts and necrotic debris by washing with non-medicated soap and water and drainage of pus.

Pharmacological (Furunculosis, folliculitis)

Majority of purulent lesions of skin structures do not need systemic antibiotic therapy. However, more extensive lesions with collection of pus require drainage and antibiotic. Cover lesions with clean dressing.

A. Mild and localized superficial infection give topical therapy with following and should be applied locally twice a day as a thin film after thoroughly washing the affected sites with soap and water for 7-10 days.

Cream Framycetin sulphate in base 1%

Or

Cream 2% Sodium fusidate base

Or

Cream 2% Mupirocin base

B. Multiple site superficial pyoderma, invasive varieties and secondary pyoderma

Cap. Cloxacillin 250-500 mg 6 hourly for 5-7 days.

In Children 12.5-25 mg/kg to 500 mg 6 hourly.

Or

Cap. Cephalexin 500 mg orally 6 hourly for 5-7 days.

In Children 12.5-25 mg/kg up to 500 mg 6 hourly for 5-7 days.

Or

Tab. Cotrimoxazole (960 mg) 12 hourly for 5-7 days.

In Children 6 mg/kg of Trimethoprim up to a maximum of 160 mg 12 hourly for 5-7 days.

C. Impetigo

Cloxacillin or Cephalexin in same doses as above.

Or

Tab. Erythromycin stearate 250-500 mg every 6 hours for 7 days.

In Children: Syp. Erythromycin 40 - 50 mg/kg/day in 4 divided doses for 7 days.

If no response to the above treatment within 48 to 96 hours refer to a tertiary care level.

CELLULITIS AND ERYSIPELAS

Cellulitis and erysipelas are streptococcal infections of the subcutaneous tissues, usually resulting from contamination of minor wounds.

Salient features

- Acute localized inflammation and edema. Erysipelas is more superficial and has a well-defined, raised margin. Potentially fatal systemic toxemia may supervene in patients who remain untreated.
- Recurrent cellulitis or erysipelas can result in chronic

lymphoedema, which may, in turn, serve as a predisposing factor for recurrent attacks of infection. In infants, facial lesions may be caused by *H. influenzae.*

Treatment

If patient has systemic features i.e., high grade fever, and symptoms of endotoxic shock.

Either regimen A or regimen B depending on sensitivity pattern of the patients to penicillin.

Regimen A

Inj. Procaine Benzylpenicillin 1.5 g (1 million IU) IM 24 hourly. In children 50 mg/kg (50,000 IU/kg) up to 1.5 g IM 24 hourly.

Or

Inj. Benzylpenicillin (sodium or potassium salt) 0.6-1.2 g (1-2 million IU) IV or IM 6 hourly for 7-10 days.

In children 30-60 mg/kg up to 1.2 g IV or IM 6 hourly.

Once improved, followed by

Cap. Amoxicillin 500 mg orally 8 hourly.

In children 10 mg/kg up to 500 mg orally 8 hourly.

Regime B (For patients sensitive to Penicillin)

Inj. Amoxycillin 250 mg plus Clavulanic acid 125 mg 3 times a day for 7-10 days.

In children Amoxycillin 6.7 mg/kg plus Clavulanic acid 1.7 mg/kg 3 times a day for 7-10 days.

Once improved followed by

Cap Cephalexin 500 mg orally 6 hourly.

In children 12.5-25 mg/kg up to 500 mg orally 6 hourly.

If localized cellulitis

Cap Amoxicillin 500 mg orally 8 hourly.

In children 10 mg/kg 8 hourly.

Or

Cap Cephalexin 500 mg orally 6 hourly.

In children 12.5-25 mg/kg up to 500 mg orally 6 hourly.

PYOMYOSITIS

Pyomyositis is characterized by deep seated muscle abscess most commonly due to *Staphylococcus aureus*. Although pyomyositis may follow trauma, mostly the infection is due to haematogenous spread.

Treatment

Nonpharmacological

Drainage and identification of the organism.

Pharmacological

Inj. Cloxacillin 500 mg IV 6 hourly for 5-10 days.
In Children 12.5-25 mg/kg up to 500 mg IV 6 hourly.
Following improvement, change to oral medication.
Cap Cloxacillin 500 mg 6 hourly to complete the treatment course.
In Children 12.5-25 mg/kg per dose up to 500 mg 6 hourly.
If patients do not respond to above treatment,
Inj. Vancomycin 500 mg IV 6 hourly.
In children 10-15 mg/kg/dose every 6 hours IV.
Total duration of antibiotic therapy should be 7-10 days.

Patient education

- Maintainance of local hygiene by cleaning with soap and water is important.
- Avoid use topical antiseptics as they produce contact dermatitis.

References

1. Bacterial Infections. In: Textbook of Dermatology. Champion RH et al (eds.), 6th Edition, Blackwell Science Ltd., London, pp 1097.
2. Pyoderma. In: Dermatology in General Medicine. Irulla M Freedberg et al (eds), 5th Edition, McGraw Hill Company Inc., pp 2183.

LEPROSY

Leprosy is a chronic granulomatous disease affecting skin and nerves caused by *Mycobacterium leprae*. Mode of spread is by respiratory droplet infection and close personal contact.

Salient features

- Cardinal signs of leprosy are hypo-pigmented, hypoaesthetic skin lesions or symptoms of nerve involvement in the form of tingling sensation, paraesthesia or gross sensory or motor deficit, thickening of nerves and demonstration of AFB within the skin.
- Leprosy may be classified as paucibacillary (PB): Patient with less than 5 lesions hypoaesthetic, hypopigmented (including nerves); Multibacillary (MB):Patient with 5 or more lesions including skin and nerve.

- Baseline investigations before starting antileprotic drugs include: haemogram, LFT, slit skin smear – if facilities available, chest x-ray and tests to rule out G6PD deficiency.

Treatment

Complicated leprosy with or without drug reactions should be referred to a tertiary care centre.

Blister pack for MB, PB and single lesion PB patients are available each contains all medicines for 28 days.

Blister pack for MB patients.

Dosage (Adult MB)

Supervised treatment on day 1. Following in a 28 day cycle which has to be repeated 12 times.

DAY 1 Rifampicin (R): 600 mg, Clofazimine (C): 300 mg, and Dapsone (D): 100 mg.

Domicillary treatment for 2-28 days: C: 50 mg, D: 100 mg.

Dosage (Children < 10 years)

Day 1 supervised R: 300 mg, C: 100 mg, D: 25 mg.

Day 2 – 28 domicillary: C: 50 mg twice a week D : 25 mg daily.

Duration: Patient has to take a total of 12 blister packs within 18 months.

Blister pack for PB patients

Dosage (Adult PB): Following is a 28 day cycle, which has to be repeated 6 times.

Monthly treatment

Day 1 (Supervised), R: 600 mg D : 100 mg.

Daily treatment: Day 2-28: D: 100 mg.

Dosage children < 10 years.

Day 1 (Supervised) R: 300 mg D: 25 mg.

Day 2-28 D: 25 mg.

Blister pack for single lesion PB patients (SLPB) **- ROM therapy.**

Adult (Single dose therapy)

Rifampicin: 600 mg, Ofloxacin: 400 mg, Minocycline: 100 mg.

Child (Single dose therapy).

Rifampicin: 300 mg, Ofloxacin: 200 mg, Minocycline: 50 mg.

If the treatment is interrupted the regimen should be recommenced where it was left off to complete the full course.

Management of complications (acute or subacute inflammation): Reversal reaction or Type 1 reaction and Erythema Nodosum Leprosum or Type 2 reaction

If the reaction is mild (no nerve involvement): Bed rest and paracetamol.

If there is nerve involvement: Tab. Prednisolone 40-60 mg once a day and gradually reduced weekly or fortnightly and eventually stopped (12 week course). Continue treatment with MDT without interruption along with anti-reaction treatment.

Patient education

- Treatment of leprosy with only one drug or incomplete treatment will result in drug resistance. Explain that the treatment for leprosy has to be carried out without default for many months to obtain complete cure. Also explain the dangers of inadequate or no treatment.
- Explain the side effects of dapsone which include dapsone syndrome, fixed drug eruptions, exfoliative dermatitis; Clofazimine can cause darkening and staining of the skin which is reversible on stopping treatment.
- All patients who were earlier treated with dapsone monotherapy (prior to implementation of MDT programme) should be retreated with appropriate regime of MDT irrespective of disease activity.
- All patients who have either received irregular or doubtful treatment should also be given an appropriate MDT regime.
- Reassurance that the disease is completely curable and do not need segregation.
- All the members of the family in contact with the leprosy patient should be examined.

References

1. Leprosy. In: Textbook of Dermatology. Champion RH et al. (Eds), 6th edition, Blackwell Science Ltd., London,pp 1215.
2. Leprosy In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th edition, McGraw Hill Company Inc., New York, pp 2306.

CUTANEOUS TUBERCULOSIS

Cutaneous tuberculosis affects skin and/or mucosa with or without underlying systemic involvement.

Salient features

- Lupus vulgaris - granulomatous dermatitis with marginal activation central clearing and atrophy.
- Scrofuloderma - granulomatous ulcer with fibrosis, atrophy sinus formation and deeper structure involvement.

- Tuberculosis veruccosa cutis - verrucous plaque with atrophy.
- Tuberculides - papulonecrotic, miliary, lichen scrofulosorum.

Confirm the diagnosis with investigations viz. haemogram with ESR, Montoux test, chest x-ray, sputum examination and AFB staining and FNAC, if available.
If the facilities are not available, it is advisable to refer the patient to a higher centre for confirmation of the diagnosis rather than starting empirical antitubercular therapy.

Treatment

The drug regimen should ideally be a daily treatment regimen in TB treatment category I.
Initial phase – 2 EHRZ/2SHRZ (for details see section on tuberculosis).
Continuation phase – 4 RH.
In specialized situations like scrofuloderma with an underlying focus in a bone/joint the regimen should be suitably prolonged in consultation with an orthopaedic specialist.

Patient education

- Skin tuberculosis is a milder type of tuberculosis infection, and is generally noncontagious.
- It shows excellent response to antitubercular therapy.

References

1. Antitubercular Therapy. Mycobacterial Infections. In: Textbook of Dermatology. Champion RH et al. (eds), 6th edition, Blackwell Science Ltd., London, pp 1189.
2. Tuberculosis and other Mycobacterial Infections. In: Dermatology in General Medicine - Fitzpatrick TB et al (eds), 5th edition New York, pp 2274.

SCABIES

A common skin infestation caused by anthropoid mite (*Sarcoptes scabiei*) and transmitted by close personal contact after an incubation period of 3-4 weeks.

Salient features

- Nocturnal itching, excoriated papules, papulovesicles, burrows and excoriation, marks on interdigital clefts of hands, wrist, axillary folds, breasts, periumblical region, medial side of thigh and genitals (in males).

- Burrows are pathognomonic and a family history of similar complaints invariably present.
- Common complications are secondary pyoderma, eczematization and glomerulonephritis (post streptococcal).

Treatment.

Nonpharmacological

Maintenance of adequate personal hygiene by daily bath with soap and water.

Pharmacological

Secondary bacterial infection when present should be treated with antibiotics before specific antiscabetic therapy.

1. **Specific therapy**

   For infants, neonates, children, pregnant and lactating mothers.

   Permethrin cream 5% to be applied generously preferably after hot scrub bath, at bedtime covering entire surface of the body below neck (except face). Minimum contact period 8-12 hours; single application required and is to be washed off next morning.

   Or

   Crotamiton Lotion/Cream 10% to be applied below neck twice daily for 3 consecutive days. Bathing permissible in between application. (Usage over face in children permissible).

   For children >10 years and adults:

   Permethrin cream 5%as outlined above.

   Or

   Gamma Benzene Hexachloride (GBHC) Lotion 1%. Single overnight application below neck on entire body surface after a thorough scrub bath. Minimum contact period 8-12 hours, to be washed off next morning.

2. **Supportive therapy**

   Tab. Cetrizine 10 mg at night for 10-15 days.

   In children 0.3 mg/kg/day single dose for 2 weeks.

   Or

   Tab. Pheniramine maleate 25 mg 3 times a day for 10-15 days.

   In children 0.5 mg/kg/day divided in 3 doses.

Follow up after one week, if residual lesions present, a topical anti-pruritic such as crotamiton either alone or in combined with hydrocortisone may be advised.

Patient education

- Disinfestation of bedding and clothing by ordinary laundering is required.

In lactating mothers–before feeding, areola should be washed thoroughly with soap and water. After the feed, permethrin cream should be reapplied on breasts and hands.

- Itching will persist for few days but usually resolves within 1-2 weeks. The overuse/repeated treatment with topical antiscabetic is not required.
- All family members and close physical contacts symptomatic or not should be treated simultaneously to prevent recurrences.
- Repeated topical application of GBHC or accidental ingestion may lead to adverse neurological effects such as seizures.

References

1. Disease Caused by Arthropods and other Noxious Animals. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 1458.
2. Scabies and Pediculosis. In: Dermatology in General Medicine, Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York, pp 2677.

PEDICULOSIS (LICE INFESTATION)

Two species of lice are obligate parasites in man namely *pediculus hominis* which has two variants (a) *pediculus humanus capitis*, the head louse (b) *pediculus hominis corporis*, the body louse and *phthirus pubis* (the pubic louse).

Salient features

- Severe itching frequently followed by secondary bacterial infection with sub occipital and retroauricular lymphadenopathy and eczematization, resulting in matting of hair.
- Transmission occurs by head to head contact, sharing of combs and caps, infested clothing of bedding and poor personal hygiene; transmission of pubic lice is by sexual contact.
- Among exception, blue grey maculae (maculae cerulea) of altered blood may be seen at the site of bites.

Treatment

Nonpharmacological

Infested clothing and bedding should be washed properly in hot water and dried in sunlight. Cloths should be ironed from inside with special attention to seam line.

Pharmacological

1. **Specific therapy**

Lotion GBHC 1% to be applied on scalp (in head louse infestation), whole body including pubic region, thighs, buttocks (in pubic and body lice infestation) for a period of 12 hours to be washed off later on.

Or

1% Permethrin rinse, single one hour application on the affected area.

For scalp lice repeat after one week.

2. **Supportive therapy**

If persistent itching,

Tab. Cetrizine 10 mg once daily at night for 7 days.

In Children (2-6 years) 5 mg; (>6 years) 10 mg once daily.

Or

Tab. Pheniramine maleate 25 mg 3 times a day for 7 days.

In Children 0.5 mg/kg/day in 3 divided doses.

3. **Treatment of the secondary infection** (see section on bacterial skin infections).

In pubic lice infestation, sex partner should be treated as well, and a search for other STD should be undertaken.

Patient education

- Infested clothing and bedding should be washed properly in hot water and dried in sunlight.
- In case of pubic lice shave the area, if possible, and adequate personal hygiene.
- Daily bath with soap and water and change of clothing. To remove nits with the help of a fine toothcomb in head lice. Other family members and schoolmates, if infested have to be treated simultaneously.

References

1. Diseases Caused by Arthropods and other Noxious Animals. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London,pp 1423.
2. Scabies and Pediculosis. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds) 5th Edition, McGraw Hill Company Inc., New York, pp 2680.

MYIASIS (MAGGOTS)

Myiasis is the infestation of body tissues of man and animals by the larvae of *Diptera* (two-winged flies). Clinically myiasis can be classified according to the part of the body affected: cutaneous myiasis, wound myiasis and furunucular myiasis in which larvae penetrate and develop within the skin nasopharyngeal myiasis; intestinal and urogenital myiasis.

Salient features

- The eggs or larva - maggots can be seen in large numbers in the suppurating lesions.
- Furuncular form, boil like lesions develop gradually over a few days.
- Each lesion has a central punctum, which discharges serosanguineous fluid. Posterior end of the larva is usually visible in the punctum.
- Creeping eruptions are tortuous, threadlike red line with a terminal vesicle marks, the passage of the larva through the skin.
- Regional lymphadenopathy, mild constitutional symptoms and eosinophilia.

Treatment

Put mineral oil, turpentine oil or petroleum and removing gently the larva with the help of a forceps.Sometimes punctum is to be enlarged by cruciate incisions.

Patient education

- Explain the patient about personal hygiene and also explain about the proper care of the wound.

References

1. Diseases Caused by Arthropods and other Noxious Animals. In: Textbook of Dermatology. Champion RH et al (eds), 6th Edition. Blackwell Science Ltd., London.

ONYCHOMYCOSIS

Invasion of the nail plate by *Dermatophytes, Candida, Scytalidium* or rarely non-dermatophytes moulds is called onychomycosis.

Salient features

- The nail plate may appear to be discoloured (green or black), disfigured or in extreme cases might be totally destroyed. The nail folds may also show swelling, redness and purulent discharge.
- Other causes of nail plate involvement should be ruled out e.g. psoriasis, eczema, alopecia areata, lichen planus or paronychia.

Treatment

Pharmacological

Systemic therapy

Tab. Griseofulvin (ultramicronised) 10 mg/kg in 2 divided doses after meals for 6 months for hand nails and 12 months for toe nails.

Or

Cap. Fluconazole 6 mg/kg (maximum 150 mg) weekly for 6 months for hand nails and 12 months for toe nails.

Or

Tab. Terbinafine 250 mg once a day for 4 weeks.

In children <20 kg: 62.5 mg/day; <40 kg: 125 mg/day; >40 kg 250 mg/day.

No role of topical treatment (except topical Cicloporoxalamine 0.1% as an adjuvant therapy).

CANDIDIASIS

Candidiasis (or candidosis) is an infection with protean clinical manifestations, caused by *Candida albicans*. The infections are usually confined to the skin, nails, mucous membrane, and gastrointestinal tract but can be systemic and infect multiple internal organs. Various mechanical, nutritional, physiological, systemic and iatrogenic factors predispose to candida infection.

Treatment of oral candidiasis, vaginal and vulvovaginal candidiasis and balanitis or balanoposthitis are discussed in respective sections.

Cutaneous candidiasis

Intertrigo is the most common clinical presentation of candidiasis on glabrous skin.

- Common locations for the infection include the genitourinal, subaxillary, gluteal, interdigital and submammary areas and between the folds of skin of the abdominal wall.
- Pruritus, erythematous macerated areas of skin with satellite vesicopustules.

Candidal paronychia

It is common in individuals whose hands are chronically involved in wet work e.g. housewives, bakers, fishermen.

- Redness, swelling and tenderness of the paronychial area with prominent retraction of cuticle toward the proximal nail bed. Occasionally pus can be expressed from beneath this area. The nails might also be infected.

Treatment

Nonpharmacological

To keep the affected area dry and clean.

Pharmacological

Cap. Fluconazole 3-6 mg/kg (maximum 150 mg) orally once a week depending upon the area affected for 4-6 weeks.

In case nail plate is also involved treat as onychomycosis except griseofulvin.

TINEA CAPITIS

Ringworm of the scalp in which the essential features is invasion of hair shafts by a dermatophyte fungus. School going children (mostly prepubertal) are most commonly affected.

Salient features

Variable depending on the types of hair invasion, level of host resistance and degree of inflammatory host response.

- **Gray scaly patch** appears as patches of partial alopecia often circular in shape with fine scaling. Green florescence under the wood's lamp is usual.
- **Kerion** is a painful inflammatory condition, seen as hair follicles discharging pus, thick crusting & matting of adjacent hair.
- **Black-dot variety** relatively noninflammatory type of patchy alopecia - seen as black dots occur as the affected hair breaks at the surface of the scalp.
- **Favus:** yellowish, cup-shaped crusts known as scutula. Adjacent crusts enlarge to become confluent and form a mass of yellow crusting.
- Diagnosis is confirmed by demonstration of spores in KOH wet mount and brilliant green fluorescence in wood's lamp examination.

Treatment

No role of topical therapy alone.

Systemic therapy

Tab. Griseofulvin 10 mg/kg in 2 divided doses for 6–8 weeks.

Or

Tab. Fluconazole 6 mg/kg weekly for 6 to 8 weeks.

Or

Tab. Terbinafine 250 mg once a day for 4 weeks.

Patient education

- All siblings, children in contact should be screened and treated simultaneously if required.
- Fomites such as combs should be kept separate.

Reference

1. Mycology. In: Textbook of Dermatology. Champion RH et al (Eds) , Blackwell Science, Oxford, pp 1277-1366.

DIAPER DERMATITIS

It is a very common problem in small infants. It is induced by the occlusion of the areas covered by diapers due to the use of impermeable disposable diapers but often triggered by an episode of watery diarrhoea.

Treatment

Zinc oxide paste (petroleum jelly 50%, zinc oxide 50%) may prevent skin irritation due to diarrhoea.
If secondary infection. Clioquinol 1-2% powder can be added to zinc oxide paste.

Patient education

- Avoid impermeable disposable diapers.
- Keep the skin dry.

ECZEMA AND DERMATITIS

The term eczema, a particular type of inflammatory response of the skin common to many different eczematous disorders. Dermatitis and eczema are synonymous. Customarily the eczemas are divided into :

- Endogenous (constitutional; atopic dermatitis, seborrhoeic dermatitis, lichen simplex chronicus (LSCh) and
- Exogenous (environmental; contact dermatitis (ABCD), primary irritant dermatitis, photosensitive eczema).

Salient features

- Itching and vesicular eruptions on erythematous skin with erosion and exudation in acute cases and thickening, accentuated skin markings, fissuring with pigmentation described as lichenification in chronic cases.

Treatment

A definitive diagnosis of the type of eczema is mandatory, as different varieties of eczema require different management strategies. However, at primary health care level the aim is to provide relief of symptoms and signs appropriate to the stage of dermatitis and subsequent referral to a tertiary care centre for diagnosis and appropriate management strategy.

In exudative eczema in acute stages

Saline soaks with dilute Potassium permanganate solution (1:10,000 and 0.25% silver nitrate solution, 0.8% Aluminium sub acetate solution).

In infective eczema,

1. Hydrocortisone 0.1% locally thrice a day in cream base during acute and subacute stage and in ointment base during chronic stage for 2-3 weeks (see Table 1).

   Or

   Betamethasone valerate 0.1%/Triamcinolone acetonide 0.1% in cream base in acute and ointment base in chronic stage for appropriate duration in twice daily doses.

Table 1. ***Preparations of local corticosteroids available in the market***

Group 1	(Hydrocortisone acetate 1%, Desonide 0.05%) Generally safe for chronic application. Safest amongst steroids for use on face, under occlusion/ bandage, in neonates/infants. Not expected to cause local or systemic side effects in the course of normal use.
Group 2	(Clobetasone butyrate 0.05%, Mometasone furoate 0.1%, Fluticasone propionate 0.01%, Betamethasone valerate 0.05-0.1%) May be used on chronic dermatoses on extremities. Used for limited periods only on face and/or intertriginous areas of adults and children, under close supervision and follow up. Potential for local side effects with prolonged use.
Group 3	(Betamethasone dipropionate 0.05%, Halcinonide 0.025%-0.1%) To be used on recalcitrant chronic dermatoses of adult-elder children only. Can cause local or systemic side effects.
Group 4	(Clobetasol propionate 0.05% combination preparation with Gentamicin sulphate (0.1%) with Miconazole 2% available).

To be used for limited period of time (2 week at a time) as the risk of side effect is highest.
Use only in extremities and thickened skin lesions.
To be used only when follow up/supervision is good.
Not to be used on face/flexures or in infants/neonates.

2. Systemic treatment
   Tab. Pheniramine maleate 25 mg 2 times a day till symptoms subside (about 7 days).
   In children 0.5 mg/kg/day in 3 divided doses.
   Or
   Tab. Cetrizine 10 mg at bed time till symptoms subside.
   In children Syp. Promethazine 1 mg/kg/day 3 times a day till symptoms subside (about 7 days) or Syp. Cetrizine 0.3 mg/kg/day once daily till symptoms subside.
3. Secondary bacterial infection should be treated in the acute stage with systemic antibiotics (see section on bacterial skin infections).

If there is no response or in case of extensive eczema (preferably under the supervision of a specialist) give,

Tab. Prednisolone 1 mg/kg (maximum 60 mg) as a single oral dose given in the morning after breakfast for 7-10 days.

Patient education

- Common skin allergens are: overexposure to water or dry air, soaps and detergents, solvents, cleaning agents, chemicals, rubber gloves, or ingredients in skin and personal care products.
- Following local side effects can occur due to misuse or over use of corticosteroids: thinning of skin, striae distensae, increased facial redness and telangiectasia, purpura, tinea incognito, acneform papules and increased hair growth.
- Systemic side effects can occur due to prolonged use of systemic corticosteroids or local applications on large surface area.

References

1. Eczema, Lichenification and Prurigo. In: Textbook of Dermatology. Champion RH et al (eds), 6th Edition, Blackwell Science Ltd., London ;pp 629.
2 Topical Glucocorticoids. In: Dermatology in General Medicine, Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York.
3. Potical Therapy. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London; pp 3547.

MILIARIA

Miliaria is caused by obstruction of the sweat glands during hot humid summer seasons.

Salient features

- Itching, stinging and secondary infection can occur and lead to periporitis (multiple staphylococcal abscesses) superimposed on miliaria rubra in young children. Eczematization can occur.

Treatment

Nonpharmacological

- Avoid causal factors like heat and occlusion due to oils, creams, cosmetics etc.
- Cool baths and aeration.

Pharmacological (Miliaria rubra)

1. Emollients like anhydrous lanolin or Calamine lotion locally.
   Or
   Talc or any commercially available powders.
2. In case of secondary infection (see section on bacterial skin infections).
3. For relief of itching Tab. Pheniramine 25 mg 2 times a day.

Patient education

- Frequent cool bath and aeration.
- No oil application over scalp and body.

ACNE VULGARIS

Chronic inflammatory condition of the pilosebaceous glands of the face, neck and upper back. Usually occurs in adolescents and young adults.

Salient features

- Two types of lesions noninflammatory (comedones: blackheads or white heads) and inflammatory: pustules, nodules, cysts and abscesses.
- Acne can be secondary to mechanical friction/occlusion, detergents/chemicals, ultraviolet exposure, occupational,

associated hirsutism/virilism exogenous, other climate/factor / and drugs namely steroids topical or systemic, INH, rifampicin, phenytoin, lithium, halogenated drugs - bromides/chlorides, cosmetics/oils/petroleum/cream applications.

Treatment

Nonpharmacological

Washing/cleaning of face to keep skin non-sticky, dry and dirt free; shampooing to keep scalp - non greasy.

Pharmacological

Noninflammatory acne

Retinoic acid cream/gel (0.025%; 0.05%; 0.1%) start with the lowest strength (0.025%) cream and increase gradually to a maximum of 0.1%. Usually applied once a day - at bedtime or alternate day. A therapeutic response appears characterized by redness and scaling with in 3-6 weeks. Treatment is usually continued for at least 3 months.
(**CAUTION**: Not to apply near/into eye/mouth; contraindicated in pregnancy and lactation)

Or

Azeleic acid cream/gel 20% applied once or twice a day after face-wash. (**CAUTION**: Avoid in pregnancy).

Inflammatory acne

Mild cases

1. As above.
2. Erythromycin gel/lotion 2%; 4% (safe in pregnancy) to be applied twice a day (or more) for 4-6 weeks. Begin with the lower strength.

   Or

   Clindamycin gel 1% to be applied twice a day (or more) for 4-6 weeks.

   Or

   Benzoyl peroxide gel 2.5%, 5% (safe in pregnancy) to be applied to clean skin initially once daily on alternate days then twice a day (or more) for 4-6 weeks. Non responders may require treatment with the 10% preparation.

Moderate to severe cases (should be referred to a specialist preferably without treating with systemic antibiotics)

1. Topical therapy as above.
2. Cap. Tetracycline 250 mg daily 4 times for 4-8 weeks. The dosage can be reduced in accordance with the clinical response and discontinued.

Or

Cap. Minocycline 50-100 mg daily.

Or

Tab. Erythromycin (as stearate or ethyl succinate) 250 mg 4 times daily for 6-8 weeks, then 2 times daily until improvement occurs.

Treatment may need to be continued for up to 6 months. Severe and unresponsive cases should be referred to a tertiary care hospital.

Patient education

- Redness and scaling with retinoic acid indicates a therapeutic response. Gels are less irritating. Lasting benefit only after long duration use of comedolytic agents usually for more than 6 months.
- Avoid oil application on the scalp and should wash scalp on alternate day.
- Not to use occlusive applications: oils, creams, pomades, foundation makeup, occlusive topical medications, if at all required, use preferably a gel or lotion.

References

1. Disorders of the Sebaceous Glands. In: Textbook of Dermatology, Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 1940.
2. Disease of the Sebaceous Glands. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York, pp 769.

ALOPECIA AREATA

Alopecia areata is presumed to be an immunologically mediated disorder characterized by patchy loss of hair.

Salient features

- Hair loss and in two-thirds of the cases, partial or complete regrowth of hair occurs within 5 years.
- Rule out patchy loss of hair secondary to tinea capitis and syphilis.

Treatment

Topical agents may stimulate localized hair growth.

Hydrocortisone acetate ointments or cream 1% applied 1 to 4 times or Fluticasone propionate 0.1% applied once a day as thin film and frequency of application is reduced when response is observed. Application is stopped as soon as lesions resolve.

Or

Dithranol ointment 0.1% Treatment should be started with the 0.1% ointment. After 7 days, the concentration may be increased to 0.25% and subsequently doubled, if necessary, at weekly intervals to a maximum strength of 2%. A thin layer of ointment should be applied once daily to the affected areas for 2-4 weeks. After application, the ointment should be left in place for 10-20 minutes before rinsing thoroughly.

Or

Intralesional Triamcinolone 10 mg/ml 0.2-0.5 ml per patch every 3 weeks (**should be treated by a specialist**).

PUVA therapy is sometimes effective in unresponsive cases.

In patients with extensive hair loss, a wig or partial hairpiece provides a more satisfactory solution.

References

1. Drugs used in Skin Diseases, WHO Model prescribing information WHO, Geneva, 1997.

PITYROSPORUM INFECTIONS OF THE SKIN

Tinea versicolor and Pityriasis capitis (Dandruff)

Tinea versicolor is an infection of the skin caused by the dimorphic fungus-*Malassezia furfur*. Pityriasis capitis (Dandruff) is caused by *Pityrosporum ovale.*

Salient features

- Tinea versicolor is characterized by superficial, scaly, hypo or hyperpigmented, irregular macules most often occurring on the trunk and proximal extremities.

Treatment (Tinea versicolor)

1. Topical 2.5% Selenium sulfide lotion.

   Or

   Topical Ketoconazole 2% lotion, apply once for 15 minutes before taking bath below neck upto the waist.

   In facial lesions,

   Topical Miconazole 2% cream apply twice daily for several weeks.

   Or

   Topical Clotrimazole 1% cream.

2. Tab. Fluconazole 400 mg as a single dose (can be combined with topical therapy for faster relief).

PITYRIASIS ALBA (PATCHY HYPOCHROMIA)

Pityriasis alba affects over 80% children, its etiology is obscure.

Treatment

1. The topical preparations (emollients) should be applied at night and washed off in the morning. The treatment is maintained for 4-6 weeks.
2. Hydrocortisone -17 butyrate ointment or cream 0.1% apply thin layer of cream on the affected skin twice daily until symptoms resolve.

   Or

   Crude coal tar sol 5-10 %/ ointment, apply a thin layer of ointment to the affected areas once daily until lesions resolve.
3. Tab. Mebendazole 100 mg 2 times a day for 3 days.
4. Zinc and vitamin supplementation if signs of deficiency are present.

ACUTE URTICARIA

Urticaria (hives) is a nonspecific vascular response to a wide variety of stimuli. Acute urticaria presents with erythematous wheels, which may be associated with swelling of loose connective tissue (angioedema) affecting lips, face, scrotum, larynx and trachea.

Treatment

Nonpharmacological

Soothing applications - cold water sponging and clearance of airway in case of laryngeal oedema.

Pharmacological

Tab. Pheniramine maleate 25 mg 2 times a day for 1-2 weeks.
In children 0.15 mg/kg daily in 3 or 4 divided doses. The dosage should be adjusted according to response and tolerance.

Or

Tab. Hydroxyzine 10-25 mg 4 times a day.
In children 15-25 mg 4 times a day.

Or

Tab. Cetrizine 10 mg once daily.
In children 5 mg once daily.
In severe cases, antihistaminics can be started intravenously and once controlled, patient is maintained on oral preparations as above.

Angioedema of the larynx is a medical emergency.

Inj. Epinephrine (as hydrogen treatment) in 0.5-1.0 ml of 1:1000 IM injection. Patients with severe airway obstruction may have to be intubated immediately (for details see section on anaphylaxis).

Patient education

- Identify and avoid precipitating factors.

CUTANEOUS REACTIONS TO DRUGS

Drug eruptions may follow the use of topically or systemically administered drugs. A drug reaction should be suspected whenever there is a sudden worsening of a dermatitis at a time when the patient should be improving.

Treatment

Stop the suspect drug, particularly if the drug eruption is severe. In some mild drug reactions, it may be possible to continue the drug if it is medically necessary.

Treatment is symptomatic in a mild case. However, in severe drug eruptions such as exfoliative dermatitis and generalized bullous reactions, systemic corticosteroids with following may be required:

Tab. Prednisolone 1 mg/kg (maximum 60 mg/day).

VIRAL INFECTIONS OF THE SKIN

Varicella (chickenpox) and Herpes Zoster (Shingles) are caused by varicella zoster virus (VZV).

VARICELLA (CHICKEN POX)

Varicella is the primary infection caused by VZV. It is highly infectious and is transmitted by droplet infection. The incubation period is about 14 days. Reactivation disease results in *Herpes zoster* or Shingles. Treatment of varicella is discussed in paediatric section.

HERPES ZOSTER (SHINGLES)

Herpes Zoster occurs due to reactivation of VZV which lies dormant in sensory nerve root ganglion following primary infection as chickenpox.

Salient features

- Grouped vesicular lesions on an erythematous base in a dermatomal distribution with severe localized pain.
- Thoracic segment and trigeminal nerve area is more commonly involved; Involvement of ophthalmic division of trigeminal nerve (eruptions in the ophthalmic area including tip of nose) may lead to corneal ulcers and scarring.

- Post herpetic neuralgia defined as persistence of pain for more than 1 month after healing of zoster, motor nerve involvement leading to paralysis of facial muscles, ocular muscles and bladder can occur.
- Lesions in immuno-compromised and HIV patients may involve multiple dermatomes and course of the disease is painful and prolonged.

Treatment

Nonpharmacological

Rest and isolation alone in case of mild disease in an otherwise healthy person.

Pharmacological

Supportive therapy

1. Tab. Ibuprofen 400 mg 3 times a day till resolution of symptoms
   In children 10 mg/kg/day.
   Or
   Tab. Nimesulide 100 mg 2 times a day till resolution of symptoms
   In children 5 mg/kg/day in 2 divided doses.
2. Tab. Pheniramine 25 mg 2 times a day till resolution of symptoms
   In children 0.5 mg/kg/day every 8 hours.
3. Calamine lotion topically till resolution of symptoms.

Definitive therapy

When patient reports within 24-72 hours and has disseminated lesions
Tab. Acyclovir 800 mg 5 times a day for 5-7 days.
In children 80 mg/kg/day in divided doses.

Refer immediately to a tertiary care hospital in case of immuno-compromised patient (HIV/AIDS and patients with chronic debilitated disease), involvement of ophthalmic division, and non-responders.
Inj. Acyclovir 10 mg/kg IV 8 hourly for 5-7 days.

HERPES SIMPLEX

Herpes simplex is the commonest infection caused by DNA virus, *Herpes virus hominis* (HSC). Type 1 classically associated with facial infections and type 2 is typically genital. Following primary infection, virus remains latent in sensory nerve ganglia and its reactivation under various circumstances is responsible for recurrent episodes. Transmission occurs by direct contact or droplets from infected secretions. Incubation period is 4-5 days. Diagnosis is confirmed by Tzanck smear made from a vesicle,

on Giemsa staining it shows multinucleated giant cells and ballooning degeneration of keratinocytes.

Salient features

- Grouped vesicular lesions on erythematous base are present on lips (herpes labialis) or tongue, palate and buccal mucous membranes (herpetic gingivostomatitis) or anywhere else on the body.
- Primary episode is painful and associated with regional tender lymphadenopathy. Recurrent episodes are relatively asymptomatic.
- Complications include disseminated herpes simplex in debilitated and immunosuppressed patients, herpetic encephalitis or meningitis, eczema herpeticum in patients with atopic dermatitis and erythema multiform.

Treatment

Supportive therapy in herpes labialis

A. Mild case is self limiting (5-7 days) and no specific therapy is required.

B. Moderate to severe case.

Tab. Acyclovir 200 mg 5 times a day for 5 days.

Prophylaxis (Recurrent episodes more than 6 per year, Refer to a specialist)

Tab. Acyclovir 400 mg 2 times a day Or 200 mg 3 times a day for 6 months to 1 year and, in addition, continue supportive therapy.

Patient education

- It is an infectious condition transmitted by direct contact/droplet infection. Therefore, the patient should avoid contact until all the lesions get crusted.
- Herpes simplex 2 is transmitted via sexual route, so patient should take proper precautions.

References

1. Viral Infections. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd, London, pp 1008.
2. Herpes Simplex. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, Mc Graw Hill Company Inc., New York, pp 2414.

MOLLUSCUM CONTAGIOSUM

A common pox virus infection of early childhood, transmitted by contact. In adults, infection is transmitted sexually. Incubation period varies from 14 days to 6 months.

Salient features

- Lesions are usually multiple and distributed on exposed areas and individual lesion is shiny, pearly white, hemispherical papule with central umbilication. Central core contains a cheesy material.
- Untreated lesions usually get cleared following local inflammation in 6 to 9 months.

Treatment

Nonpharmacological

Do not share towels/clothing.

Pharmacological

For extensive lesions

Extirpate molluscum body and touch the central core with Trichloroacetic acid (TCA) 10% to 20%.

Or

Tretinoin cream (0.05%) to be applied topically daily till lesions heal. If possible, patient should be seen at least twice, about 3-4 weeks apart, in order to treat the incubating lesions that are too small to see initially.

Patient education

- Avoid any kind of direct contact with the infected persons. Pregnant women should avoid sexual contact with a partner who has molluscum, (especially late in the pregnancy). The use of condoms is recommended for those who do not abstain.
- Avoid swimming pools, communal baths and contact sports.
- Partner education for prevention of this disease.

References

1. Viral Infections. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 1005.
2. Molluscum Contagiosum. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York, pp 2478.

VIRAL WARTS

Human papilloma virus (HPV) causes viral warts. Transmission occurs by inoculation of infected material in breaches in skin or mucous membranes. Incubation period varies from 1 to 4 months.

Salient features

- It can present in different clinical patterns viz. common warts (verruca vulgaris), palmoplantar warts, plantar warts (verruca plana) and filiform warts commonly found in the beard area of an adult male.
- Lesions are asymptomatic except plantar warts, which may be painful.

Treatment

1. Paring and debridement of the lesion so as to remove dead tissue.
2. Application of chemical cauterizing agent like 25-50% Trichloroacetic acid (TCA).

For genital warts:

Podophyllin 20-25% in Tr. Benzoic Co. applied locally (after covering the surrounding normal skin with vaseline) weekly for 6-12 sittings.

Or

Electrocautery (single sitting).

Patient education

- Avoid contact with the infected patients. Transmission occurs via contact with breach in the skin and mucous membrane.
- Education on safe sex in case of genital warts.

References

1. Warts. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, McGraw Hill Company Inc., New York, pp 2484.
2. Viral Infections. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 1005.

LICHEN PLANUS

Lichen planus is a symptom complex of itching and self-limited eruptions which can involve the glabrous skin, mucous membrane,

hair and nails. The natural history is variable with a usual course of 9-18 months. Oral and hypertrophic lesions run chronic course. Diagnosis is usually clinical, however, should be confirmed by a specialist.

Salient features

- Violaceous polygonal papules, intensely pruritic plaques over the skin and greyish white streaky (Lacy pattern) mucous membrane lesions.
- Drugs causing lichenoid eruptions are - captopril, allopurinol, beta-blockers, gold, tetracycline, arsenic, teramisels, penicillamine, NSAIDs, INH, chloroquine, carbamazepine.

Treatment

1. Topical Corticosteroids (Group 4: super potent; for details see Table 1 in eczema and dermatitis section pp 267) ointment.

   Or

   In hypertrophic lesions: intralesional Triamcinolone acetonide injections given every 2-3 weeks till the lesions flatten.
2. In case of extensive lichen planus interfering with the patient's normal life, nail atrophy and pterygium formations, extensive ulcerative lesions of mucous membrane, follicular lichen planus of scalp and bullous lichen planus: Tab. Prednisolone (1 mg/kg) maximum 60 mg daily as single dose in the morning for 6 weeks and thereafter gradually tapering over a period of another 6 weeks.

   Or

   Tab. Dapsone 100 mg twice a day.
3. If itching: Tab. Pheniramine 25 mg 2 times a day.

Duration of the treatment is usually 3-6 months.

Patient education

- Lichen planus is non infectious disease and noncancerous. It is neither inherited nor related to nutrition and is self limiting.
- Treatment provides relief of symptoms only.

References

1. Textbook of Dermatology. Champion RH et al. (eds), 6thEedition, Blackwell Science Ltd., London ; pp 1015.

PSORIASIS

Psoriasis is a common, genetically determined, inflammatory and proliferative disease of the skin characterized by chronic, red scaly plaques, particularly on the extensor prominences and on the scalp.

Salient features

- Asymptomatic erythematous, well-defined, dry scaly papules and plaques of various sizes.
- Grattage (Scratch) test: scales can be removed in layers (similar to one scratching a wax candle).
- Auspitz sign: when the scales are completely scraped off, multiple bleeding points are seen.
- Koebner phenomenon - lesion produced at trauma sites.

Treatment

Investigate for baseline parameters and counselling about chronicity of the disease.

Nonpharmacological

Identify and avoid triggering factors.

Pharmacological

Patient suffering from less than 10% body involvement may only be treated at a primary care level. Patient having greater than 10% body involvement should be referred to a tertiary care level for initiation of therapy, management thereafter may be continued under primary care physician.

Avoid systemic corticosteroids.

1. Tar (6% in white vaseline) - applied topically at bed time except face and flexures followed by sun exposure next morning.

   Or

   Group 4 potent topical corticosteroids (Table 1 in eczema and dermatitis section pp 267) applied once daily, with or without occlusion till improvement occurs.
2. Salicylic acid (3%) in white vaseline, a thin layer is applied daily which the lesions have resolved.
3. Tab. Erythromycin 500 mg 4 times a day for 1 week.
4. Cap. Vitamin A 50,000 units to 1 lac units daily 6-8 weeks.
5. Tab. Pheniramine maleate 25 mg 2 times a day.

Refer to a tertiary care centre if patient shows no improvement in 6-8 weeks or develops pustular psoriasis, psoriatic arthropathy or erythroderma.

Patient education

- It is a chronic disease characterized by remissions and relapses and prognosis is variable.
- Trauma infection, streptococcal throat infection, pregnancy, hypocalcemia, winter, emotional stress, alcohol, AIDS and drugs like beta blockers, NSAIDs, lithium, chloroquine and rapid withdrawal of corticosteroid therapy can exacerbate psoriasis.

References

1. Psoriasis. In: Textbook of Dermatology. Champion RH et al (Eds.) 15899, 6th Edition. Blackwell Science Ltd., London.
2. Psoriasis. In: Dermatology in General Medicine. Irwin M. Freedberg et al (eds), 5th Edition, McGraw Hill Company Inc., pp 495.

VITILIGO

Vitiligo is a pigmentation disorder in which melanocytes in the skin, mucous membranes, and the retina of the eyes are destroyed. The cause of vitiligo is not known. It is more common in people with certain autoimmune diseases including hyperthyroidism, adrenocortical insufficiency, alopecia areata and pernicious anaemia. Vitiligo may also be hereditary.

Salient features

- Depigmentation of the skin and hair is common in sun-exposed areas, including hands, feet, arms, face, and lips. Other common areas for white patches to appear are the armpits and groin and around the mouth, eyes, nostrils, navel, and genitals.
- There is no way to predict if vitiligo will spread. Some people have reported additional depigmentation following periods of physical or emotional stress.

Treatment (To be treated at a tertiary care center)

Pharmacological

Therapy for vitiligo takes a long time - it usually must be continued for 6 to 18 months. The choice of therapy depends on the number of white patches and how widespread they are and on the patient's preference for treatment. Each patient responds differently to therapy, and a particular treatment may not work for everyone.

1. Topical Group 4 steroid for 4 to 6 months (for details see Table 1 in a section on eczema and dermatitis pp 267).

Or

Topical psoralen photochemotherapy.

Or

Cap. Methoxsalen (10 mg) 0.3-0.4 mg/kg administered 2 hours before exposure to ultraviolet radiation. Between 12-24 sessions are usually necessary. The sessions should be given 2 or 3 times weekly (at least 48 hours apart).

2. Depigmentation of the unaffected area if greater than 90% area is already affected to get uniformity in colour.
3. Surgical Therapies.

- Autologous skin grafts, skin grafts using blisters, micropigmentation (tattooing), Autologous melanocyte transplants.
- Cosmetics that cover the white patches improve their appearance and help patients to feel better about themselves.

Patient education

- Counselling and reassurance as it can cause a lot of emotional stress.
- Talking with other people who have vitiligo may also help a person to cope up.
- The National Vitiligo Foundation can provide information about vitiligo and refer people to local chapters that have support groups of patients, families, and physicians. Family and friends are another source of support.

MELASMA

Melasma often appears during pregnancy in women living in dry, sunny climates, but is most frequently seen in those taking oral contraceptives. Melasma of pregnancy usually resolves in few months after delivery but, otherwise, spontaneous remission is rare.

Treatment

Sunscreens containing either p-aminobenzoic acid or benzophenones a sun protection factor (SPF) rating of at least 15,

Or

Topical preparations containing Calamine, Zinc oxide, Titanium dioxide or other constituents which reflect incident light (physical sunblock) can also provide useful protection when they are applied carefully.

ALBINISM

Albinism is an autosomal recessive inherited disorder. Patients are at

risk of skin damage from sunlight and usually develop cutaneous malignancies at an early stage.

Treatment

There is no effective therapy other than total avoidance of direct sunlight from early childhood.

References

1. Drugs used in skin diseases, WHO Model Presecribing Information WHO, Geneva, 1997.

DERMATOLOGICAL EMERGENCIES

A quick assessment of the condition of the patient can be made by assessing whether eruptions involve large areas of skin or blisters and erosions present or does patient appear ill?

Serious emergencies involve blisters and erosions covering large areas of skin with toxic symptoms like fever, tachycardia, tachypnoea and dehydration. These patients require urgent referral to a specialist centre.

Three broad groups are:

Group I – Extensive blistering and erosions - e.g. pemphigus, toxic epidermal necrolysis, Stevens Johnson Syndrome.

Group II – Extensive skin involvement without blisters - erythroderma, viral exanthemas, drug rashes.

Group III – Localized skin lesions - cellulitis, necrotizing fascitis.

Treatment

Group I - To be treated at a tertiary care level (Pemphigus, Toxic Epidermal Necrolysis, Stevens Johnson Syndrome)

Toxic Epidermal Necrolysis (TEN)

1. Identify the causative factor and stop exposure immediately.
2. Dressing (see section on burns).
3. IV fluid replacement as per grade III burns depending on the area affected (see section on burns).
4. Care of eye and mucus membranes: Clear eroded areas with soap and water, clean eye lesions by irrigation with normal saline and frequent change of position in bed (see section on eye infections).
5. If oral candidiasis (see section on candidiasis).

Stevens Johnson syndrome

This is a milder form of TEN involving mainly mucus membranes and

skin lesions are targetoid (Iris).

1. Identify and immediately stop the offending agent.
2. If oral candidiasis (see section on candidiasis).

Nonpharmacological

Clear eroded areas with soap and water, clean eye lesions by irrigation with normal saline and frequent change of position in bed. Maintain fluid and electrolyte balance.

Pharmacological

Systemic antimicrobial therapy may be needed for patients with secondary infections (see section on bacterial infections).

Topical applications with Povidone iodine cream/lotion.

Or

Silver sulfadiazine cream.

Or

Silver nitrate sol 0.5% compresses soaked in a 1:100 dilution of the stock solution are applied every 4 hours.

For erosions in mucosa

Povidone iodine mouth wash.

For erosions in eye

Antibiotic eye drops (e.g. Ciprofloxacin eye drops 6 hourly).

High dose of oral Tab. Prednisolone 1-2 mg/kg daily (maximum of 60 mg/day). Once stabilization has occurred the dosage should be gradually reduced to the lowest dosage.

Group II - Non-bullous skin eruptions (Erythroderma, Viral Exanthemas, Drug rashes)

Nonpharmacological

Bath with soap and water, high protein diet and keep patient well covered to avoid heat loss.

Pharmacological

1. Tab. Pheniramine maleate 25 mg 2 times a day for duration of symptoms.
2. Emollients like white vaseline or coconut oil.
3. Topical corticosteroids - low potency (class III/IV) viz. Clobetasone butyrate (0.05%)

   Or

   Hydrocortisone cream 0.1% (for details see table 1 in eczema and dermatitis section pp 267).

After initiating the above therapy patient may be referred to a specialist for further management.

Group III - Localized Skin Lesions (Cellulitis, Necrotizing Fascitis)

For management of cellulitis (see section on cellulitis) and irritant dermatitis (see section dermatitis).

SEXUALLY TRANSMITTED DISEASES

Urethral Discharge

Common causative organisms are *Neisseria gonorrhoeae* (gonococcal urethritis) and *Chlamydia trachomatis* (non-gonococcal urethritis-NGU).

Salient features

- Obvious purulent discharge and/or dysuria or discharge on milking urethra.
- Demonstration of gram negative diplococci on Gram stain suggests gonococcal urethritis.
- On Gram's stain, oil immersion field >5 polymorphs signifies NGU.
- There is a 40–60% rate of concomitant NGU along with gonococcal uretheritis.
- All patients must be routinely tested for syphilis (VDRL) and HIV.

Treatment

Nonpharmacological

Plenty of oral fluids.

Pharmacological (Gonococcal urethritis)

1. Inj. Ceftriaxone 250 mg IM as a single dose.

   Or

   Tab. Ciprofloxacin 500 mg as a single dose.

   Or

   Inj. Spectinomycin 2 g IM as a single dose.
2. Cap. Doxycycline 100 mg twice a day for 1 week.

Pharmacological (Non Gonococcal Urethritis - NGU)

1. Cap. Doxycycline 100 mg twice a day for 1 week.

   Or

Cap. Tetracycline 500 mg every 6 hours for 1 week.

Or

Tab. Erythromycin 500 mg every 6 hours for 1 week.

Patient education

- Tracing and treatment of sexual partners, health education and counselling.

References

1. The Umbilical, Perianal and Genital Regions. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London.
2. Gonorrhoea. In: Dermatology in General Medicine. Freedberg IM et al (eds), 5th Edition, McGraw Hill Company Inc., pp 2600.

GENITAL ULCERS

Genital ulcers can occur commonly in syphilis, chancroid and herpes progenitalis and rarely due to donovanosis and chlamydia.

Approach for treatment

If vesicular lesions are present or there is a history of preceding ulcer give treatment for *Herpes progenitalis*. If there are no lesions, perform dark field microscopy and serological tests for syphilis (STS). If STS are positive give treatment for syphilis. If STS are negative, treat as for chancroid. However, where facilities for serological tests and dark field microscopy are not available should institute empirical therapy for both syphilis and chancroid.

Treatment (Syphilis)

Inj. Benzathine Penicillin 2.4 M units IM stat (1.2 M units in each buttock after sensitivity testing).

Or

Inj. Procaine Penicillin 1.2 M units IM daily for 10 days (after sensitivity testing).

If no response after 10 days or repeat STS become positive after initial improvement, refer to a higher centre.

In case of penicillin hypersensitivity

Cap. Doxycycline 100 mg twice a day for 15 days.

Or

Cap. Tetracycline 500 mg every 6 hours for 15 days.

Treatment (Chancroid)

Inj. Ceftriaxone 250 mg IM as a single dose.

Or

Tab. Cefixime 400 mg as a single dose.

Or

Inj. Ceftazidime 500 mg IM as a single dose.

Or

Tab. Erythromycin 500 mg every 6 hours for 7 days.

Or

Tab. Cotrimoxazole 960 mg twice a day for 7 days.

If no response after 7 days, refer to a higher centre.

Treatment (Herpes progenitalis)

Tab. Acyclovir 200 mg 5 times daily for 7 days.

Or

Tab. Acyclovir 400 mg 3 times a day for 7 days.

References

1. The Umbilical, Perianal and Genital Regions. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 3163.
2. Chancroid. In: Dermatology in General Medicine. Freedberg IM et al (eds), 5th Edition, McGraw Hill Company Inc., pp 2587.

BALANITIS & BALANOPOSTHITIS

Inflammation of glans (balanitis) and prepuce (posthitis) caused by *Candida albicans* or bacteria.

Salient features

- Small papules or fragile papulovesicles on the glans or in the coronal sulcus. These break to leave superficial erythematous erosions with a collorette of whitish scale. Infection may spread to the scrotum and inguinal areas.

Treatment (Candidiasis)

Tab. Fluconazole 150 mg single dose (Also treat partner with the same dose and frequency).

If prepuce is retractable and there are ulcers, in addition, treat as in genital ulcers. If urethral discharge is present, treat as for urethral discharge. However, if there are no ulcers or discharge treat for candidiasis.

References

1. The Umbilical, Perianal and Genital Regions. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London, pp 3163.
2. Diseases and Disorders of Anogenitalia of Males. In: Dermatology in General Medicine. Breedberg I Metall (eds), 5th Edition, McGraw Hill Company Inc., pp 1348.

INGUINAL BUBO

Enlargement of lymph node in groin area; common causative organisms are STD related – LGV, chancroid and non STD – tuberculosis and filariasis.

Treatment

If no genital ulcers, it should be treated as in LGV.
Fluctuant bubo may be aspirated in a non-dependent manner with a wide bore needle. (Incision and drainage is not recommended).

Pharmacological (LGV)

Cap. Doxycycline 100 mg twice a day for 2 to 3 weeks
Or
Cap. Tetracycline 500 mg every 6 hours for 2 to 3 weeks
Or
Tab. Erythromycin 500 mg every 6 hours for 2 to 3 weeks
Or
Tab. Cotrimoxazole 480 mg 2 tabs twice a day for 2 to 3 weeks
Also examine and treat the partner as above.
Follow up after 7 days and if improvement is there complete the treatment.
If no response refer to a higher centre.

Patient education

- Counselling and explain importance of single partner and methods of safe sex and use of condoms.
- Contact tracing and treatment of the sexual partners is important.

References

1. The Umbilical, Perianal and Genital Regions. In: Textbook of Dermatology. Champion RH et al. (eds), 6th Edition, Blackwell Science Ltd., London; pp 3163.
2. Lymphogranuloma venereum. In: Dermatology in General Medicine. Freedberg IM (eds), 5th Edition, McGraw Hill Company Inc., pp 2519.

15

OBSTETRICS & GYNAECOLOGY

NORMAL PREGNANCY

This is a transient physiological state during a woman's reproductive years, but it requires important considerations regarding diet, life-style and drug therapies to achieve a good foetal outcome with minimal maternal morbidity and mortality.

Treatment

Instruct the woman regarding

1. Diet: Caloric requirements depends on the physical work done by the women. The increased requirement of 300 Cals. For the pregnancy state is to be made available by exogenous supply of diet. An ideal pregnancy diet should be light, nutritious, easily digestible and rich in proteins, vitamins and minerals. The diet should consist of at least half-a-litre if not one litre of milk, plenty of green leafy vegetables (one katori serving in each meal) and fruits as available, in addition to normal Indian diet consisting of a balanced cereals and pulses combination. Foods rich in iron like green vegetables, jaggary, and protein rich foods like nuts should be stressed upon. Fat consumption can be predominantly of animal source so as to take care of vitamins A & D.

2. Exercise: Any exercise, the woman is accustomed to can be continued, but not to the point of fatigue. No new exercise should be initiated during pregnancy. Sedentary women should be allowed only walking. Women with multiple foetuses and complications like heart disease, pregnancy induced hypertension, intrauterine growth retardation should not exercise.

. Clothing: Should be non-constricting.

. Travel: Road travel is allowed with safety belt. Traveling in a pressurized aircraft is of no risk, should walk about every 2 hours.

Employment: Jobs requiring prolonged standing (> 8 hours/day) are associated with a minimum risk of pre-term delivery.

Clinical workup during each antenatal visit – BP, weight-gain, oedema feet, symphyseal-fundal height, presentation, fetal heart rate(s), amniotic

fluid volume, inquiry about daily foetal movement charting, and pelvic assessment at 38 weeks.

Rh –ve women (with Rh +ve husband) need to be monitored on similar lines with additional testing with Indirect Coomb's test (ICT) at first visit, 28 weeks and 34-36 weeks. Antenatal Anti D immunoglobulin 100 mcg IM is recommended in ICT negative patients at 28 weeks of pregnancy and postpartum 350 mcg IM if baby is Rh +ve. ICT +ve patients are to be managed only at centres with facilities for amniocentesis and/or cordocentesis, amniotic fluid optical density estimation and intrauterine foetal transfusions.

7. Lab workup during pregnancy as follows:

Gestational Age	**Lab Assessment**
Initial	- Haemoglobin
(as early as possible)	- Urine (routine & Microscopy)
	- Blood groups and Rh typing
	- Screen for syphilis
	- Hepatitis B infection screening
	- HIV screening (Ethical issues)
	- Cervical cytology
16-18 weeks	- Ultrasound for foetal anomalies
26-28 weeks	- Haemoglobin
	- Diabetes screening
32-36 weeks	- Ultrasound
	- Haemoglobin

8. Tab. Folic acid supplements 5 mg once daily, at least 3 months before conception, and continue till 12 weeks of gestation.
9. Dose of Iron (60-100 mg elemental iron) and Folic acid (Tab. Iron folic acid) once daily and calcium gluconate 500 mg tablet twice daily from 12 weeks till 3 months postpartum.
10. Immunization: 2 doses of tetanus toxoid 4–6 weeks apart, (mumps, measles and rubella vaccines are contraindicated). Rest of the vaccines can be administered, if indicated as in nonpregnant state.

Patient education

- Explain the danger signals when she should report to the health center – vaginal bleeding, swelling on face or hands, severe or continuous headache, blurring of vision, abdominal pain, persistent vomiting, oliguria, fever, dysuria, escape of fluid from vagina or change in frequency or intensity of foetal movements.
- Explain about black staining of stools due to oral iron, therefore not to worry about it
- Iron and calcium supplements should be taken at different times of

the day at least 2 hours apart.

- Discuss birth spacing after delivery.
- Sexual intercourse should be avoided when abortion/pre-term labor threatens, and during last 4 weeks in any pregnancy.
- Bowel: constipation, fissures and haemorrhoids are common during pregnancy and should be treated with fluids, exercise and bulk laxatives and stool softeners.
- Smoking, alcohol and drug abuse: smoking, alcoholism and drugs are contraindicated. Caffeine is best avoided.
- Daily foetal movement charting (DFMC): After 28 weeks, the woman should keep foetal movement count.
- Follow-up visits: every 4 weeks till 28 weeks, every 2 weeks till 36 weeks and weekly thereafter.

References

1. F Gary Cunningham, Paul. MacDonald, Kenneth J Leveno et al, 1997.

NAUSEA AND VOMITING IN PREGNANCY

Nausea & vomiting of mild to moderate intensity are especially common complaints from early pregnancy until about 16 weeks. In few cases it may progress to hyperemesis.

Salient features

- Common complaint on rising in the morning but sometimes occurs at other times of the day, vomitus is usually small & clear and doesn't produce any impairment of health or restrict the normal activities of the pregnant woman.
- Severe nausea & persistent vomiting progress to hyperemesis leading to weight loss, ketosis and there may be muscle wasting. There are usually signs of dehydration with postural hypotension & tachycardia.
- Diagnosis is by exclusion of medical & surgical causes of vomiting like liver or GIT disorders, pyelonephritis, diabetes mellitus etc. and molar (& multiple) pregnancy should be ruled out in all cases of hyperemesis by ultrasound.

Treatment

Nonpharmacological

Reassurance and advise to take frequent small, dry carbohydrate rich

meals and avoid fatty or spicy foods, especially avoid large volume of drinks in the morning.

Pharmacological

A. Mild to moderate cases

1. Tab. Doxylamine succinate 10 mg + Pyridoxine HCl 10 mg 1-2 tablets at bed time. If required one more tablet can be added in the morning and afternoon.

   Or

   Tab. Metoclopramide 10 mg 2-4 times a day in moderately severe cases.

B. Hyperemesis Gravidarum

Nonpharmacological

1. Admit all cases in the hospital away from a stressful home environment.
2. Stop oral intake of fluids & nutrition.
3. Serum electrolytes & urinary ketones to be checked at admission and 6 hourly.
4. Emotional support, psychiatric referral if required.

Pharmacological

Adequate & appropriate fluid & electrolyte replacement. Normal saline or Ringer's lactate solutions are appropriate solutions & KCl is added as required. If urinary ketones are present, then 1 liter of 10% dextrose is transfused over 3-4 hours.

In prolonged vomiting

Tab. Thiamine 25-50 mg 3 times a day (if orally tolerated)

If vomiting are not controlled with fluid and electrolytes replacement in 6 - 8 hours.

1. Inj. Metoclopramide 10 mg IV or IM 8 hourly.
2. Inj. Ranitidine 50-100 mg 6 hourly.
3. If not controlled,

   Inj. Promethazine chloride 25-50 mg IM or IV 8 hourly or Inj. Chlorpromazine 25-50 mg IM 4-6 hourly.

Once vomiting are controlled for 24 hours, oral intake is gradually started. If well tolerated then only IV fluids are omitted. At first dry carbohydrate foods are given in the form of small meals at frequent intervals. Gradually full diet is introduced. In prolonged and severe disease, parenteral nutrition may be necessary. Give Tab. Metoclopramide 10 mg 3 times a day and Tab. Ranitidine 150 mg 2 times a day.

If well tolerated for 48 hours, patient can be discharged from the hospital with dietary advice, reassurance & continue Tab. Metoclopramide for 5-7 days or longer depending on the response.

Patient education

- Adjust timing of medication in relation to the time of sickness.
- This is a benign disorder & gets relieved by 14 - 16 weeks of pregnancy.

References

1. Gastrointestinal Disorders. In: Williams Obstetrics F Gary Cunningham, Paul. MacDonald, Kenneth J Leveno et al (eds), 1997, pp 1145-1172.
2. Disorders of Gastrointestinal Tract, In: Medical Disorders in Obstetric Practice, Michael de Swiet (ed), 1991, pp 521-583.

BLEEDING IN FIRST TRIMESTER OF PREGNANCY (ABORTION)

Salient features

- Bleeding in first trimester of pregnancy can be due to pregnancy related complications such as abortion (threatened/inevitable/ incomplete/missed), ectopic pregnancy and molar pregnancy or due to local causes such as trauma, erosion, polyp, infection, premalignant or malignant lesions.
- Diagnosis is based on the findings of clinical examination, sonography and serum hCG levels as shown in table 1
- Local lesions are diagnosed on per speculum examination

Table 1: ***Evaluation of patients presenting with bleeding in the first trimester of pregancy***

Diagnosis	Clinical findings	USG/ hCG
Threatened abortion	Uterine size = period of gestation(POG) Internal Os closed	Consistent with live fetus
Inevitable abortion	Uterine size = POG Internal Os open	Cardiac activity + internal Os dilated
Incomplete abortion	History of passing products of conception (POC) Uterine size < POG Internal Os open/ closed	POC in uterine cavity
Missed Abortion	Uterine size < POG Internal Os closed Brownish discharge +	Cardiac activity absent
Molar	History of passing vesicles	Honeycomb appearance

Pregnancy	± Uterine size ≥ POG Internal Os open/closed	ß hCG levels very high
Ectopic pregnancy	Cervical excitation Unilateral tender fornix	Pseudogestational sac empty uterine cavity adenexal mass, hCG rise <66% in 48 hours

Treatment

- Abortion can be treated at a primary care level.
- Molar and ectopic pregnancy should be treated at a secondary/tertiary care level.
- Hospitalize all patients of bleeding in the first trimester.
- Assess for blood loss and take immediate measures to combat hypovolemia as indicated.

Surgical therapy: suction evacuation in all cases of abortion and molar pregnancy except threatened abortion.

- Laparotomy/laparoscopic removal of ectopic pregnancy except a few selected cases of unruptured ectopic pregnancy (see details below).

Patient education

- Exact etiology of abortions is not always apparent.
- Very early abortions are often nature's selection to abort a nonviable, chromosomally abnormal conceptus.
- Increased abortions are seen with increasing parity and maternal age.
- Recurrent abortions 2 or more consecutive abortions should be investigated before planning the next pregnancy.
- Effective contraception should be initiated soon after abortion as ovulation can occur as early as 2-3 weeks after an abortion.

THREATENED ABORTION

Nonpharmacological

Bed rest.

Pharmacological

1. Inj. Morphine 15 mg IM stat for those who have pain and are anxious.

   Or

   Inj. Pethidine 50 mg + Promethazine 25 mg IM stat for those who have pain and are anxious.
2. Tab. Folic acid 5 mg daily.

3. Monitor for the continuation of pregnancy.
Discharge the patient 48 hours after bleeding stops.

Patient education

- To report immediately if bleeding recurs or it is more than normal periods.
- Continue bed rest for at least 2 weeks.
- Abstinence till at least two follow-up visits in the next 4 weeks when normal continuation of pregnancy is documented.
- High fibre diet to avoid constipation.
- Need of follow up after 2 weeks for foetal growth by clinical and/or USG parameters.
- After suction evacuation for abortion.
  - Reassurance if no living child.
  - Need for contraceptive.
  - When to resume coitus.
  - When to attempt conception.

References

1. Abortion. In: William's Obstetrics, 20th Edition, 1997, Prentice-Hall International, Inc., pp 597-606.
2. Haemorrhage in Early Pregnancy. In: Textbook of Obstetrics, 4th Edition, 1998, New Central Book Agency (P) Ltd., pp 170-215.

SEPTIC ABORTION

Any abortion associated with fever and signs of pelvic or generalized sepsis is considered septic abortion. Most septic abortions result from illegal abortions but sepsis may follow spontaneous & elective abortions.

Salient features

- Fever, tachycardia, abdominal distension and tenderness, pelvic tenderness, and purulent vaginal discharge. In severe cases there may be endotoxic shock & end organ failure.
- Complications like injury to viscera like uterus and bowel, internal or external haemorrhage, disseminated intravascular coagulation, renal failure, hepatic failure, endotoxic shock and tetanus can occur.

Treatment (To be managed at a tertiary care level)

Before starting antibiotic therapy, high vaginal or cervical swab & blood

culture should be obtained.

Pharmacological

1. IV fluids for correction of electrolyte imbalance (see section on shock).
2. Oxygenation: O_2 by facemask in severe cases. In cases of adult respiratory distress syndrome intubation and ventilatory support is required, and hydrotherapy if required.
3. If blood pressure is not controlled with fluid replacement, Inj. Dopamine infusion in 5% Dextrose 2 - 5 mcg/kg/min and dose titrated according to clinical and haemodynamic response (for details see section on shock).
4. In cases of shock, acidosis is corrected by IV Sodium bicarbonate 50-100 mEq in normal saline.
5. Inj. Penicillin 3,000,000 units IV every 4 hours (after test dose).
   Or
   Inj. Ampicillin 500 mg IV 6 hourly (after test dose).
   Or
   Inj. Cefuroxime or Ceftazidime 1-2 g IV 2 times a day (after test dose).
   Or
   Inj. Chloramphenicol 500 mg IV 6 hourly.
6. Inj. Gentamicin 1.5 mg/kg then 1 mg/kg IV 8 hourly.
   Or
   Inj. Amikacin 250 - 500 mg IV 8 hourly.
7. Inj. Metronidazole 500 mg IV 8 hourly.
   Or
   Inj. Clindamycin 600 mg IV 6 hourly.

   Continue antibiotic therapy for 48-72 hours until culture sensitivity results provide an indication for changing the initial antibiotic regimens. Monitor pulse, temperature, blood pressure, respiratory rate, urine output, and serum electrolytes. In severe cases CVP & ABG monitoring is required. Therapeutic goals are to maintain systolic BP >90 mmHg, urine output >30 ml/min, arterial PO2 >60 mmHg, and CVP 6 - 12 cm of H_2O.
8. A) Uterine curettage: if patient's condition is stable, within 1 hour of antibiotic therapy, evacuation of the uterus by gentle curettage to remove infected products. If general condition is low at admission, curettage after 6 - 8 hours of antibiotic therapy & treatment of hypovolemia is done.

   B) Laparotomy in case of injury to the uterus, suspected injury to the gut, presence of foreign body in the abdomen as evidenced by X ray or felt through the fornix, peritonitis, and (septic shock or oliguria not responding to the conservative treatment).
   Or

Colpotomy in cases of pelvic abscess.

Patient education

- Advise about contraceptive methods and knowledge about the availability of safe MTP services should be imparted to all cases of unsafe abortions.

References

1. Abortion. In: William's Obstetrics, F Gary Cunningham, Paul MacDonald, Kenneth J Leveno, et al (eds), 1997, pp 579-605.
2. Septic Shock in Obstetrics. In: Critical Care Obstetrics. Steven L Clark, David B Cotton, Gary DV Hankins, et al (eds), 1991, pp 289 - 305.
3. The Abortion Problem. In: Postgraduate Obstetrics & Gynaecology. MK Krishna Menon, PK Devi, K Bhaskar Rao (eds), 1989, pp 89-105.

ECTOPIC PREGNANCY

Treatment of ectopic pregnancy should be undertaken at a secondary/ tertiary care level set up. Laparoscopic surgery or laparotomy is done in all cases of ectopic pregnancy except in a few selected cases who are highly compliant and reliable and fulfill the following criteria:

- Unruptured ectopic pregnancy in haemodynamically stable patient.
- Gestational sac size < 3.5 cm in greatest diameter.
- Serum hCG titer < 10,000 mIU/ml.
- Gestation< 6 weeks.
- Absence of foetal cardiac activity.

Treatment

Pharmacological (For unruptured ectopic pregnancy)

1. Obtain pretreatment hCG titers, haemogram, liver and renal function tests.
2. Inj. Methotrexate 50 mg/sq meter body surface area IM given on day 1.
3. Repeat hCG titers on day 4 & 7.
4. If day 7, hCG titers reflect a drop of at least 15% from maximum levels then weekly hCG titers till negative.
5. If fall <15% or there is rise then Inj. Methotrexate is repeated.

Patient education

- Resolution of ectopic pregnancy may take up to 6 weeks.
- 5 - 10% cases require surgery despite medical therapy.
- Signs and symptoms of tubal rupture such as vaginal bleeding, abdominal

pain, weakness, dizziness or syncope must be reported promptly.
- Patient should refrain from alcohol and folic acid containing vitamins during this period.
- Sexual relation should be avoided during therapy.

References

1. Williams Obstetrics F. Gary Cunningham, Paul. MacDonald, Kenneth J. Leveno et al (eds), 1997.

MEDICAL TERMINATION OF PREGNANCY

The Govt. of India has legalized medical termination of pregnancy up to 20 weeks of gestation by MTP Act 1971. Under this act, pregnancy can be terminated under following clauses:

Clauses and requirements

1. Damage to the life of the pregnant woman.
2. Grave injury to the physical or mental health of the pregnant woman.
3. Pregnancy caused by rape.
4. Substantial risk, that if the child was born, it would suffer from such physical or mental abnormalities as to be seriously handicapped.
5. Failure of any contraceptive method or device.

Necessary consent form as laid down in the Act should be duly filled and signed. Opinion of two registered medical practitioners is mandatory for second trimester MTP (>12 weeks).

First Trimester MTP Methods

Surgical method: Suction & evacuation done in all centres approved under MTP Act. MVA (Manual Vacuum Aspiration) can be done in all PHCs.

Patient education

- Details of the method and small risk of complications should be explained.
- Medical method fails in around 5% cases and these will require surgical curettage.
- Should be motivated for concurrent contraception and option of all available methods both temporary and permanent should be discussed.

Second trimester MTP Methods

Conducted in secondary and tertiary care level. None of the second trimester methods are 100% safe & effective. That is why many methods both surgical and medical, are available and being used. For second

trimester MTP medical methods are preferred.

- Methods are usually combined so as to increase the success rate and to shorten induction abortion interval. Most commonly extra amniotic ethacridine is combined with oxytocin or prostaglandins by various routes.
- Better results if some method for cervical ripening is used 6 - 12 hours before.
- If some method fails switch over to other method or surgical method.

Medical methods

Method	Drug	Mean induction-abortion interval	Success rate	Side effects
Extra Amniotic instillation	0.1% Ethacridine lactate 10 ml/week of gestation maximum 150 ml with IV Oxytocin after 6-24 hours Or	32 - 36 hours	75 - 80% 97%	Live foetus
Intra-muscular	15 methyl PGF2α 250 mg IM 3 hourly x 10 doses Or	15 -17 hours	95%	Nausea, vomiting, diarrhoea, broncho-spasm
Intra-vaginal	Misoprostol 200 mcg 12 hourly maximum 4 doses	Reduced by 4-6 hours		

Methods of cervical ripening: 6-12 hours before the procedure any of the following can be inserted intra cervically laminaria tent/Isaptent/ Lamicel/$PGE_{2\alpha}$ gel 0.5 mg.

Surgical methods: Hysterotomy (To be carried out by an experienced obstetrician and gynaecologist because of high risk of injury, haemorrhage and incomplete evacuation and scar endometriosis).

Patient education

1. Explain the details of the method and the need for hospital admission.
2. Risk of complications around 5 times higher than that of first trimester. Small risk of uterine rupture is there.
3. Patient should be motivated for concurrent contraception and option of all available methods both temporary and permanent should be discussed.

References

1. Manual on MTP an Update. Manju V Matalya, MJ Jassawalla (eds), 1999, FOGSI Publication.

2. Abortion. In: Williams Obstetrics, F Gary Cunningham, Paul MacDonald, Kenneth J Leveno, et al, (eds), 1997, pp 579-605.
3. The Abortion Problem. In: Postgraduate Obstetrics & Gynaecology, MK Krishna Menon, PK Devi, K Bhaskar Rao (eds), 1989, pp 89-105.

ANAEMIA IN PREGNANCY

Prevalence of anaemia in pregnancy in India is 80% and severe anaemia is 10-15%. Causes of anaemia in pregnancy are the same as those encountered in the non pregnant state. However, Iron deficiency anaemia is commonest in pregnancy. In about 40-50% of cases there is associated folic acid deficiency.

Anaemia in pregnancy is defined as haemoglobin concentration of less than 11 g/dl and haematocrit of less than 33%. It is further classified depending on Hb levels as mild 10-10.9 g%, moderate 7-10 g% and severe <7 g%.

Salient features

- In mild to moderate cases symptoms are weakness, exhaustion, lassitude, anorexia, glossittis, and stomatitis, while severe cases present with palpitation, dyspnoea, oedema and cardiac failure.
- Important basic investigations required are haemoglobin, haematocrit, total RBC counts, peripheral smear for type of anaemia and haematological indices.

Treatment (Iron deficiency anemia)

Nonpharmacological

1. Diet rich in iron - jaggery, green leafy vegetable, sprouted pulses, cooking food in iron utensils.
2. Diet rich in protein - pulses, lentils, milk and milk products.
3. All cases of severe anaemia to be admitted especially those with features of anoxia or cardiac failure.

Pharmacological

1. Oral Iron Therapy: Ferrous sulfate and Ferrous fumarate. Recommended dose is 200 mg elemental iron daily in divided doses. Not to be taken with meals, milk, coffee or tea. Continue therapy till blood picture returns to normal and then continue with 100 mg elemental iron for 3 months to build up the stores. (Common side effects are epigastric pain, nausea, vomiting, constipation, and diarrhoea).
2. Tab. Mebendazole 100 mg 2 times a day for 3 days.

   Or

   Tab. Albendazole 400 mg single dose.

Monitoring of response to therapy

Subjective improvement of feeling better, weight gain and improved appetite after 1-2 weeks. Reticulocyte response observed in 5-10 days (increases to 5-6%) and rise in Hb/haematocrit in 2-3 weeks. The concentration is expected to rise at the rate of 0.1-0.25 g/dl/day or 0.8 -1 g/dl/week.

If no improvement in 3 weeks reevaluate for: incorrect diagnosis, non compliance, defective absorption, continuing loss, associated deficiencies

Role of parenteral therapy is limited as rate of rise of haemoglobin with parenteral iron is similar to oral iron preparation.

Specific indications are: severe intolerance to oral iron, malabsorption, non compliance and moderate to severe anaemia in advanced pregnancy.

Total dose of iron to be given is calculated using following formulae:

% deficiency of Hb x weight in lbs x 0.03 + 300 mg.

Or

Simple method 250 mg of elemental iron needed for each gram of Hb deficit.

(**CAUTION** - Oral iron is suspended at least 24 hours prior to therapy to avoid reaction).

Inj. Iron dextran or Iron sorbitol complex (available as 50 mg/ml) IM after an initial test dose of 0.5 ml, the injections are given daily or on alternate days in doses of 2 ml IM using Z technique. To prevent staining of skin one can pass small amount of saline/air down the needle before withdrawing it.

(**CAUTION** - Emergency drugs to be kept ready for resuscitation in case of anaphylactic reaction).

Or

Intravenous Route: Total Dose Infusion (TDI) (to be given as inpatient).

Inj. Iron Dextran is diluted in 5% dextrose. Initial infusion is given slowly at 8 drops per min. for half an hour to watch for reaction, then increase gradually to 40 drops/min. Total iron dose is administered in a single sitting. If >2000 mg then only half dose is given in one day.

Monitor for adverse reactions like rigor, chest pain, and hypotension. If present stop the infusion.

(Note: see also anaemia in common conditions and paediatrics section)

Indication for blood transfusion are

severe blood loss, severe anaemia beyond 36 weeks of pregnancy or anaemia refractory to oral and parental therapy or anaemic patient with anoxia or cardiac failure.

Management of anaemic patients during labor

1. Propped up position, oxygen therapy.
2. Sedation and pain relief.
3. Digitalization may be required in cardiac failure due to severe anaemia.
4. Cut short 2nd stage by forceps.

5. Active management of 3rd stage of labor with Inj. Methylergometrine maleate 0.2 mg IV at the delivery of anterior shoulder. Inj. Methylergomertrine to be avoided in patients of anaemia with cardiac failure.

Megaloblastic anaemia in Pregnancy

Folic acid Deficiency

Salient features

- Patients may be asymptomatic or may have vomiting, diarrhoea, pallor, hepatosplenomegaly, and polyneuropathy.
- Diagnosis: is by MCV > 96fl, MCH > 33 pg and MCHC normal.
- Peripheral smear macrocytic anaemia with hypersegmentation of neutrophils, neutropenia and thrombocytopenia, serum folate concentration < 3 mg/ml.

Treatment

Tab. Folic acid 5 mg daily to be continued for at least 4 weeks in puerperium.

Vitamin B_{12} deficiency

Treatment

Inj. Cyanocobalamin 250 mcg IM every month.

Dimorphic anaemia

Treatment is prescription of both iron and folic acid in therapeutic dose.

Patient education

- Dietary advice as mentioned earlier.
- Common side effects of therapy should be explained to the patient.
- Tell patient that stools turn black after oral iron therapy, so no need for concern.
- Iron supplementation should continue for at least 3 months in post partum period.
- Adequate spacing of at least 3 years between 2 pregnancies.

References

1. Haematological Disorders. In: William's Obstetrics, 21st Edition, 2001, McGraw Hill Company Inc., pp1307-1323.
2. Haematological Problems During Pregnancy. In: Practical Guide to High Risk Pregnancy and Delivery. Fernando Arias (ed), 2nd Edition, 1992, Harcourt Asia Pvt Ltd., pp 245-262.
3. Anaemia and Pulmonary Tuberculosis. In: Practical Obstetric Problems. Ian Donald (ed) 5th Edition, 1998, BI Publications, pp 198-226.

4. Medical and Surgical Illness complicating Pregnancy. In: Textbook of Obstetrics,DC Dutta (ed), 4th Edition, 1998, New Central Book Agency (P) Ltd., pp 277-292.
5. Haematinics and Erythropoietin. In: Essential of Medical Pharmacology, KD Tripathi (ed), 4th Edition ,1999, Jaypee Brothers Medical Publisher Pvt Ltd., pp 580-595.

PREECLAMPSIA

Pre eclampsia is one of the commonest causes of maternal and perinatal morbidity & mortality. It affects around 5-8% of all pregnancies. Preeclampsia is principally a syndrome of signs, occurring more frequently in primigravida. When superimposed with convulsions it is termed as eclampsia. Other high risk factors are - multiple pregnancy, hydramninos, and molar pregnancy.

Salient features

- Hypertension (blood pressure >140/90 mmHg) in combination with proteinuria and/or non-dependant oedema, developing after 20 weeks of gestation in a previously normotensive non-proteinuric patient.
- Pre eclampsia is considered mild if diastolic BP <100 mmHg, protineuria trace to 1+ with minimal elevation of liver enzymes.
- Signs of severe pre eclampsia are: BP >160/100, 24 hours urinary proteins >2 g, elevated serum creatinine, thrombocytopenia (platelet count <50,000/cumm), microangiopathic haemolysis, raised liver enzymes, has diastolic BP ≥ 110 mmHg and foetal growth retardation.

Treatment

Hospitalize all cases. Definitive therapy is to terminate pregnancy. The choice between immediate delivery and expectant management depends on:

a) Severity of disease.
b) Condition of mother and foetus and
c) Period of gestation (POG).

A. Mild pre eclampsia

Expectant management: in cases of mild pre eclampsia without foetal and maternal compromise, with gestational age <37 weeks.

Nonpharmacological

Complete bed rest preferably in left lateral position and regular diet adequate in proteins & calories with omission of extra table salt.

Pharmacological

1. Antihypertensive treatment is started if there is persistent diastolic blood pressure over 100 mmHg. Aim of treatment is to achieve a systolic BP less than 130 mmHg and diastolic BP less than 90 mmHg.
   Tab. Methyldopa 250 mg 8 hourly or 6 hourly (maximum dose 2 g/day).
   Or
   Tab. Atenolol 50-100 mg once a day.

If BP is not controlled in 72 hours with the above, add any of the following :

Cap. Nifedipine 10 mg 8 hourly.
Or
Tab. Nifedipine retard 10 mg 12 hourly (maximum 30 mg 12 hourly).
Or
Tab. Labetalol 100-200 mg 8 hourly (maximum 600 mg 6 hourly).

Monitoring

- Daily monitoring of weight gain, BP, urine albumin, urine output.
- Weekly lab investigations – haemogram with platelet count, liver and kidney function tests specially serum uric acid.
- Foetal monitoring by clinical & USG growth assessment, daily foetal movement count, non stress test twice weekly and biophysical score weekly.
- In case of mild pregnancy induced hypertension without proteinuria, if after hospitalization BP is controlled with rest without any antihypertensive drug, patient can be discharged after initial evaluation if no maternal/foetal compromise is detected. It can be practiced only in reliable patients who will follow instructions for monitoring as above, and also will report ominous symptoms immediately. (Ominous symptoms are persistent severe headache, visual disturbances such as dimness of vision, double vision or blindness, epigastric pain, nausea, vomiting and oliguria).

Definitive management

Termination of pregnancy by labor induction/caesarean section in the following conditions:

- Gestational age 37 weeks, foetal compromise like severe growth retardation, oligohydramnios, abnormal non-stress test or biophysical score, maternal compromise like development of features of severe pre eclampsia, onset of labor, rupture of membrane or bleeding.

B. Severe preeclampsia (Treatment preferably in a tertiary care center)

Nonpharmacological

- Observation in intensive care for 24 hours

- Assessment of maternal and foetal conditions. BP monitoring 2–4 hourly, hourly urine output monitoring, watch for sign and symptoms of impending eclampsia and foetal distress.
- Lab Investigations: haemogram with platelet count, liver and kidney function tests, urinary proteins, coagulation profile, fundus examination, obstetric ultrasound with BPS.
- Intravenous fluids Ringer's Lactate at rate of 60 ml/h (maximum 125 ml/h).

Pharmacological

The aim of the treatment is gradual lowering of blood pressure so that diastole BP is lowered by not more than 30 mmHg to maintain adequate perfusion and systolic BP is maintained above 90 mmHg to avoid uteroplacental insufficiency.

1. **Immediate management**
   Tab. Nifedipine 10 mg orally can be repeated after 30-60 min. (maximum dose 20 mg 4 hourly).
   (**CAUTION**: Side effects-Tachycardia, headache, flushing, and aggravation of angina. Rapid fall in BP can cause foetal distress).
   If BP is not controlled with oral treatment then IV drugs are started with intensive monitoring.
   Inj. Labetalol initial dose is 50 mg slow IV followed by infusion at 60 mg/h, doubling every 15 min until BP is controlled or maximum dose 480 mg is reached.
2. **Maintenance therapy**
   After initial control of acute hypertension, patient is started on maintenance therapy with antihypertensives as described in management of mild preeclampsia.
3. **Prophylactic anticonvulsants** in women with severe preeclampsia especially in cases with signs and symptoms of impending eclampsia.
   Magnesium sulfate sol (50%) 10 ml (5 g) in each buttock (total of 10 g) followed by second dose in alternate buttocks every 4 hours.
   Before each dose monitor for presence of patellar reflex, respiratory rate >16/min and urine output > 25 ml/h.

After initial evaluation and stabilization of the patient further management is decided depending on foetal maturity and maternal response:

Expectant management: Considered if pregnancy in between 24-34 weeks and hypertension controlled with maximum of two drugs, urine output is normal, lab investigations are normal and no foetal compromise. Patient should be hospitalized till delivery.

Managed as mentioned in the mild pre eclampsia with antihypertensives, bed rest and more frequent maternal and foetal monitoring.

Definitive management is termination of pregnancy:

- Pregnancy beyond 34 weeks - stabilize maternal condition and terminate pregnancy.

- Pregnancy less than 24 weeks - stabilize maternal condition and terminate pregnancy.
- Patient on expectant management develops following features: uncontrolled hypertension despite maximum dose of 2 antihypertensive drugs, eclampsia raised liver enzyme >2 time with right upper quadrant pain and tenderness, pulmonary oedema, platelet < 1 lac/cu mm, creatinine > 1 mg/dl over baseline, persistent headache, vomiting and visual disturbance suggestive of impending eclampsia and foetal compromise.

After delivery, intensive monitoring should be continued for 72 hours with prophylactic anticonvulsant continued till 24 hours postpartum. Dose of anti hypertensives should be gradually reduced.

ECLAMPSIA

Salient features

- Occurrence of generalized convulsions associated with signs of pre eclampsia during pregnancy, labor or within 7 days of delivery and not caused by epilepsy or other convulsive disorders.
- Eclampsia occurs antepartum in 46%, intrapartum in 16% and postpartum in 36% cases.
- Patient may develop acute left ventricular failure, cerebral haemorrhage, renal cortical necrosis, DIC, foetal distress, abruptio placentae, foetal death and even maternal death can occur.

Treatment (to be managed at a tertiary care level)

Principles of management are control and prevent recurrence of convulsion and control of hypertension. Treat any complication that arise and delivery safely as soon as possible.

Continue anticonvulsant therapy 24 h after delivery or last fit whichever is latest.

Nonpharmacological

Place the patient in left lateral position in a separate, quiet room. Secure and maintain airway. Use mouth gag or airway to prevents tongue biting/ tongue falling back. Intubate if patient is deeply unconscious, poor arterial blood gases, extensive laryngeal oedema, and extreme restlessness.

- Suction to remove oropharyngeal secretions.
- Oxygen by face mask.
- Set up IV access.
- Monitor heart rate and respiration, BP, urine output.

- Lab. Investigations: haemogram with platelet count, liver & kidney function tests, urinary proteins, coagulation profile, fundus examination,

Pharmacological

1. Inj. Magnesium sulphate loading dose of 14 g of which, 4 g as 20% solution given slowly IV over 5 -10 minutes and 5 g as 50% solution given deep IM in each buttock (total 10 g IM)
   If fits are not controlled in 15 min, give 2 g Magnesium sulfate as 20% solution slow IV.
   Maintenance dose 5 g magnesium sulfate as 50% solution deep IM every 4 hours in alternate buttock Or Continuous IV regimen 4 g loading dose over 20 minutes followed by 1 g/h slow continuous IV infusion.
   (**CAUTION**: Side effects are respiratory depression and neuromuscular depression in mothers. Neonatal respiratory and neuromuscular depression).
   If respiratory depression occurs, give calcium gluconate 1 g IV as 10% sol. If respiratory arrest occurs, immediate endotracheal intubation and ventilation is to be done.
   Monitoring: Check for respiratory rate to be more than 16/min, patellar reflex to be present and urine output >25 ml/h before giving magnesium sulfate.

   Or

   Inj. Phenytoin loading dose of 15-25 mg/kg slow IV not exceeding 25 mg/min diluted in normal saline for first 750 mg and then 12.5 mg/min followed by 100 mg IV 8 hourly.
   ECG tracing to be taken every minute for 10 min during infusion of first 750 mg.
2. Fluid management should be closely monitored to prevent complications such as pulmonary oedema, left ventricular failure and adult respiratory distress syndrome.
   IV fluid should be at the rate of 1 mg/kg/hr or previous days urine output plus 30 ml.
3. Anti hypertensives: as described in preeclampsia. Aim is to gradually lower the BP to 140–150/90-100 mm Hg.

Definitive management is termination of pregnancy irrespective of the foetal maturity. Termination is by labor induction and vaginal delivery or caesarean section.

Indications of caesarean section are: all deeply unconscious patients unless delivery is imminent, uncooperative patient due to restlessness, if vaginal delivery is unlikely to occur within 6-8 hours from the onset of 1st eclamptic seizure, and other obstetric indications.

Care after delivery

- Patients of eclampsia and severe preeclampsia need intensive monitoring for at least initial 72 hours.

- Continue anticonvulsant till 24 hours after delivery or fit, whichever occurs later.
- Gradually decrease the dose of antihypertensives.
- Patient is discharged after 10-14 days of delivery or earlier if BP controlled without antihypertensives.
- Follow up after 6 weeks for reevaluation.

Patient education

- Delivery is the only definitive treatment. Underlying disease remains till delivery and complications can arise despite control of BP on treatment.
- Symptoms of severe pre eclampsia like headache, vomiting, epigastric pain, decreased urine output, blurring of vision should be immediately reported.
- Need for prolonged hospitalization.
- Early booking in next pregnancy as there is 25-30% risk of recurrence. Prophylactic measures like low-dose aspirin can be started in early pregnancy.
- Need for re evaluation at 6 weeks postpartum for reclassification and investigations of hypertension and need for long- term antihypertensives.
- High risk of development of chronic hypertension in later life.

References

1. Preeclampsia and Eclampsia. In: Practical Guide to High Risk Pregnancy and Delivery. Fernando Arias (ed), 2nd Edition Reprint 1998, Mosby, pp 183-212.
2. Hypertensive Disorders in Pregnancy. In: Williams Obstetrics. 20th Edition, 1997, Appleton and Lange, pp 693-744.
3. Advances in Management of Severe Preeclampsia and Antihypertensive Therapy. In: Recent Advances in Obstetrics and Gynecology. No. 20, John Bonnar (ed), 1998, Churchill Livingstone, pp 111-124.
4. Treatment of Severe Preeclampsia/Eclampsia Syndrome. In: Progress in Obstetric and Gynecology, Studd (ed)., 2000, Vol.14, Churchill Livingstone, pp 102-119.

PREGNANCY WITH HEART DISEASE

Organic heart disease in pregnancy is commonly due to rheumatic heart disease or congenital heart disease. Pregnancy with its increased cardiovascular stress is a potential cause for worsening of the existing heart disease.

Salient features

- Severe or progressive dyspnoea, progressive orthopnoea, paroxysmal nocturnal dyspnoea, haemoptysis, syncope with exertion or chest pain related to effort or emotions.
- Echocardiography is diagnostic.

Treatment

Ail pregnant women with heart disease should be managed at a tertiary level center with multidisciplinary approach. Depending on the limitation of physical activity patient is classified into class I to IV of New York Heart Association (NYHA). Much of the clinical approach to the pregnant women with heart disease is according to NYHA class irrespective of the aetiology of the heart disease.

Nonpharmacological

- NYHA class III & IV patients are to be hospitalized throughout the pregnancy while class I & II can be managed as outdoor patients with more frequent antenatal visits and admitted at 38 weeks.
- Rest for 10 hours each night and 1 to 2 hour after each meal. Light housework & walking without climbing stairs is permitted. No heavy work is allowed.
- Avoid high salt intake.
- Screen and treat at the earliest for excessive weight gain, abnormal fluid retention, anaemia, pregnancy induced hypertension, infections.

Pharmacological (in consultation with the cardiologist and for details see section on CHF)

In case of rheumatic heart disease,

1. Inj. Benzathine penicillin 1.2 mega units IM 3 weekly.
2. Treat any infections with appropriate antibiotics.
3. In patients with mechanical prosthetic valves.
   Inj. Heparin is given throughout pregnancy to maintain PTT at 1.5 to 2.5 times the normal control.
   (**CAUTION:** Oral anticoagulants are not safe during pregnancy because of risk of congenital anomalies in the foetus. But if required, can be given after first trimester and continued till 4 weeks before delivery. However, oral anticoagulants are safe during lactation).

Labor management

1. Vaginal delivery is contraindicated in coarctation of aorta. In other cases caesarean is performed for only obstetrical indications.
2. Pain relief is important during labor. Best option is to give continuous epidural analgesia. It is contraindicated in women with intra cardiac shunts, aortic stenosis, pulmonary hypertension, and hypertrophic cardiomyopathy. Inj. Morphine can also be given for pain relief.
3. Fluids should be restricted to 75 ml/min. Bolus Oxytocin & Methyl ergometrine should be avoided.
4. Antimicrobial prophylaxis for infective endocarditis required in all patients with cardiac lesions undergoing any operative procedure or in labor.

Inj. Ampicillin 2 g + Inj. Gentamicin 1.5 mg/kg (maximum 120 mg) IV or IM 30 min before procedure followed by Cap. Ampicillin 1 g IM or IV; or Cap. Amoxycillin 1 g orally 6 hours after initial dose.
If patient is allergic to penicillin
Inj. Vancomycin 1 g IV (over 1-2 hours) plus Inj. Gentamicin 1.5 g/kg (maximum 120 mg). Infusion to be completed within 30 min before procedure.

Patient education

- Depending on the type & severity of cardiac lesion maternal risk of pregnancy should be discussed with the patient ideally before pregnancy.
- Option of corrective surgery preferably before pregnancy.
- 2 - 5% risk of congenital heart disease in foetus if mother has congenital heart disease.
- Contraceptive advice: sterilization, progestogen only method or barrier method.
- In severe cases option of medical termination of pregnancy if pregnancy <12 weeks.

References

1. Cardiovascular Disease, In: William's Obstetrics, F. Gary Cunningham, Paul. MacDonald, Kenneth J Leveno, et al , (eds), 1997, pp 1079 - 1102.
2. Heart Disease in Pregnancy. In: Medical Disorders in Obstetric Practice, Michael de Swiet (ed), 1991, pp 198 - 248.

DIABETES IN PREGNANCY

Pregnancy can be complicated by preexisting insulin dependent or non-insulin-dependent diabetes or gestational diabetes. Gestational diabetes is defined as the carbohydrate intolerance of variable severity with onset or first recognition during pregnancy.

Treatment

All pregnancies in diabetic females should be managed at a tertiary care center.

Nonpharmacological

Dietary advice: Total daily calorie intake should be 30 KCal/kg current pregnancy body weight if her current weight is 80-120% of ideal pre-pregnancy weight. In case current weight is <80% or >120% of ideal pre-pregnancy weight, then calorie intake is 36-40/kg current pregnancy weight or 24/kg current pregnancy weight respectively. Total daily calorie

intake should be 30-35 KCal/kg current pregnancy weight. Complex carbohydrates should provide about 50% of the total calories, which should be well distributed throughout the day. High fiber diet is beneficial with 30-50 g fibers daily. Total diet should be distributed in 3 major meals and 3 mid meal snacks.

General measures: Ultrasound assessment of foetal gestational age is to be done as early as possible. Foetal congenital anomalies should be ruled out by Level II USG scan at 16 - 18 weeks and maternal serum alpha-feto protein at 16-18 weeks. Serial USG for foetal growth monitoring & biophysical scoring for assessment of foetal well being after 32 weeks of gestation.

Pharmacological

A. Antenatal Management

a. Preexisting diabetes

Oral hypoglycaemic agents are contraindicated during pregnancy.

If patient is on oral hypoglycaemics, switch over to insulin therapy as soon as pregnancy is diagnosed.

1. Inj Insulin: 0.6-0.8 U/kg in 1st trimester, 0.7 - 0.9 U/kg in 2nd trimester and 0.8 - 1.2 U/kg in 3rd trimester.
   Usually a combination of intermediate acting and regular insulin in proportion of 2:1 is given. 2/3 of the total requirement is given in the morning before breakfast and 1/3 is given at night with regular insulin before dinner and intermediate at bedtime. Dose adjustment is done according to the twice weekly blood sugar monitoring.
2. Hospitalization is required in cases of excessive vomiting, infections, maternal complications like hypertension, retinopathy, nephropathy, foetal compromise like macrosomia or intra uterine growth retardation (IUGR) or poor diabetic control.

b. Gestational diabetes

1. General management is same as outlined above.
2. Diet control. Patient is reassessed after 1 week. If control not achieved insulin therapy is started. Usually single injection in the morning is sufficient. If pregnancy >28 weeks, 20 units intermediate + 10 units regular insulin single injection 15 - 45 min before breakfast is started.

If pregnancy <28 weeks, start with the half dose.

Daily monitoring of blood glucose is done. If fasting plasma sugar is >105 mg% or postprandial >120 mg%, dose of insulin is increased. Regular insulin is adjusted to normalize post breakfast glucose and intermediate for post lunch glucose control. If evening or fasting glucose is elevated, 2nd daily injection is added. If both are elevated, mixture of intermediate and regular insulin before dinner is added. If only fasting is elevated, add intermediate acting insulin at bedtime.

Or

Inj. Regular Insulin 3 times a day before each main meal which can be combined with one dose of intermediate acting insulin at bed time in case there is fasting hyperglycaemia.

Apart from routine antenatal monitoring, blood sugar monitoring is required throughout pregnancy. Therapeutic goal is to achieve plasma blood sugar levels fasting <105 mg% and 2 hour postprandial <120 mg%. When levels are high daily monitoring with insulin dose adjustment is required. Once control is achieved, patient can be managed at home with weekly blood sugar profile.

B. Management during labor

In uncomplicated case with good glycaemic control pregnancy can be continued till expected date of delivery. In presence of complications or foetal compromise pregnancy is terminated at 38 weeks or earlier if required. If estimated foetal weight is >4 kg, caesarean section is performed. Labor is managed with intensive monitoring. Blood sugars are monitored 3-4 hourly aim is to keep blood sugars between 100-120 mg%, using the sliding scale method.

In the postpartum period, the requirement of insulin is decreased.

Patient education

- In known diabetics, good blood sugar control should be achieved in preconception period to avoid high risk of congenital anomalies.
- Strict adherence to the dietary advice & insulin therapy is essential throughout pregnancy. As insulin requirements change throughout pregnancy therefore, frequent blood sugar monitoring is required throughout pregnancy.
- Patient on insulin therapy should be told about symptoms of hypoglycaemia like palpitations, sweating, dizziness, and its management.
- In cases of gestational diabetes, there is risk of recurrence in subsequent pregnancies and later on risk of frank diabetes is there.
- Contraceptive advice. Combined oral contraceptive pills and intrauterine devices are preferably avoided. Barrier methods, progestogen only pills/ implants/injectables or sterilization can be offered.

References

1. Diabetes. In: Williams Obstetrics, F Gary Cunningham, Paul. MacDonald, Kenneth J Leveno, et al, (eds), 1997, pp 1203 -1223.
2. Insulin Management of Type I & Type II Diabetes in Pregnancy. In: Clinical Obstet Gynaecology, John W. Hare, 1991, pp 34(3), 494 - 504.
3. Management of Gestational Diabetes. In: Clinical Obstet Gynaecology, Donald R. Coustan.1991, pp 34(3), 558 - 564.

4. Diabetes. In: Medical Disorders in Obstetrics Practice, Michael Deswiet (eds), 1991.

PRETERM LABOR

Onset of labor pains in a pregnant women after 20 weeks and before 37 weeks of gestation associated with progressive dilatation and effacement of the cervix is known as preterm labor.

Salient features

- Uterine contraction of duration of 30 sec or more at interval of 10 minutes or less accompanied by cervical dilatation and effacement with or without leaking or bleeding per vaginum.
- Risk factors include: low socioeconomic status, heavy manual labor, extremes of age (<20 years and >40 years), previous history of abortion or preterm delivery, cervical or vaginal infection, multiple gestation or over distended uterus, hypoxic conditions like anaemia, heart disease, preeclampsia, IUGR, foetal congenital malformations and ante partum haemorrhage in present pregnancy.

Treatment

Nonpharmacological

Hospitalization with complete bed rest, preferably in a centre with neonatal intensive care unit.

Laboratory investigations: haemogram, urine culture, and endocervical swab for culture and sensitivity.

Pharmacological

1. Inj. Pethidine 50 mg + Inj. Promethazine 25 mg IM stat and can be repeated 8 hourly.
2. Immediate tocolysis.
   If membranes are intact and labor is not advanced (cervical dilatation <4cm).
   Inj. Isoxsuprine HCl 10 mg IM every 6 hours in case of mild contraction; Intravenous infusion if strong contractions are established 0.2-0.4 mcg/min in 5% dextrose. Maximum dose is 0.8 mcg/min to be continued at least 2 hours after the contractions cease. Followed by IM therapy for 24 hours.
   (**CAUTION**: Side effects tachycardia and hypotension, hypokalemia, neonatal tachycardia, hypotension and rarely pulmonary oedema and acute respiratory distress syndrome).

Or

Inj. Ritodrine infusion 3 ampoules (150 mg) in 500 ml of 5% dextrose or ringer lactate at 50- 100 mcg/min (5-6 drops/min), increase by 50 mcg every 10 min till contractions cease or side effects appear (maximum dose 350 mcg/min), continue for 12 hour after contractions stop. This is followed by oral treatment – 10 mg every 2 hours for 24 hours then 10-20 mg every 4-6 hours.

(**CAUTION**: Contraindications: Poorly controlled diabetes or thyroid disease, sickle cell disease).

Or

Inj. Magnesium sulfate 4-6 g as 20% solution bolus over 30 minutes followed by infusion of 4-6 g/h.

(**CAUTION**: Contraindicated in patient with myasthenia gravis, cardiac decompensation. Use with caution in renal disease. It can cause flushing, lethargy, headache, muscle weakness, dryness of mouth, nausea and foetal distress, transient non-reactive NST).

Or

Cap. Nifedipine 30 mg loading dose followed by 10-20 mg every 4-6 hours.

(**CAUTION**: Do not administer along with magnesium sulfate; contraindicated in maternal hypotension (< 90/50 mmHg), cardiac disease. Use with caution in renal disease; maternal side effects, flushing, headache, nausea, dizziness, hypotension).

Monitor pulse, BP, and cessation of the uterine contractions. If pulse rate >120/min and BP < 90/50 mmHg stop tocolysis. Monitoring in magnesium sulfate therapy is as outlined in eclampsia. Monitor for onset of choriamnionitis (fever, tachycardia with uterine tenderness).

3. Maintenance therapy

   Tab. Isoxsuprine orally 10 mg 6 hourly or 20 mg 12 hourly (maximum daily dose is 40 to 80 mg/day) to be continued till 34 weeks of pregnancy (long term therapy is controversial).

4. In pregnancies at 28 – 34 weeks of maturity, steroids are given for foetal lung maturity.

   Inj. Betamethasone 12 mg IM 2 doses 24 hours apart.

   Or

   Inj. Dexamethasone 6 mg IM four doses 12 hours apart or 12 mg IM two doses 12 hours apart.

   (**CAUTION**: Contraindicated if clinical or laboratory evidence of chorioamnionitis is present).

5. Cap. Ampicillin 500 mg or Erythromycin 500 mg 4 times a day for 5-7 days.

Patient may be discharged after 1 week of tocolysis followed by regular antenatal surveillance.

Delivery

In cases of ineffective tocolysis or with contraindications for tocolysis, labor is allowed to progress and mode of delivery is decided as per obstetric indications. Careful foetal monitoring required throughout labor - if any sign of hypoxia, caeserean section is better but foetus should have a fairly good chance of survival depending on neonatal care facility.

Patient education

- Restricted physical activity after discharge.
- Sexual abstinence till at least 34 weeks of gestation.
- Explain the risk of recurrence in subsequent pregnancy. Therefore need for early booking and prophylactic measures in next pregnancy.

References

1. Clinical Problems of Preterm Labor. In: Clinical Obstetrics and Gynaecology, 2000, pp 43, 713-818.
2. Preterm Birth. In. Williams Obstetrics, 20th Edition, 1997, Appleton and Lange, pp 797-826.
3. Preterm Labor. In: Practical Guide to High Risk Pregnancy and Delivery, Fernando Arias (ed), 2nd Edition, 1998, Mosby, pp 71-100.
4. Recent Advances in Preterm Labor. In: Recent Advances in Obstetrics and Gynaecology No 20, H John Bonnar (ed), Churchill Livingstone, pp 97-110.

ANTEPARTUM HAEMORRHAGE (APH)

Antepartum haemorrhage is defined as bleeding from genital tract after 20 weeks of pregnancy and before completion of second stage of labor. It is a major cause of maternal morbidity, mortality and perinatal loss. APH is due to placental cause in as high as 70% cases and in 25-30% of cases cause may remain undetermined.

Salient features

- Clinical presentation varies depending on the severity of blood loss (Table I) and cause of bleeding (Table II). In mild haemorrhage there may be no maternal or foetal compromise, while massive haemorrhage can lead to hypovolemic shock, coagulation failure, renal failure, foetal distress and may result in maternal and foetal death.
- Ultrasound is confirmatory.

Table I

Acute blood loss	Clinical Findings
1000 ml	None
1000–1500 ml	Orthostatic blood pressure changes, positive tilt test, Pulse Pressure = 30 mmHg, reduced peripheral Perfusion, prolonged capillary refill time.
1500–2000 ml	Cold clammy skin, tachycardia, tachypnoea, hypotension.
> 2000 ml	Profound shock, non-palpable pulse.

Table II

Placenta Previa	Abruptio Placentae
Painless recurrent bleeding	Associated pain abdomen
Relaxed non-tender uterus	Tense tender uterus
Free-floating presenting part	Foetal parts not easily palpable
Abnormal lie	Foetal heart irregular or absent
	Pregnancy induced hypertension

Treatment

All patients of APH should be hospitalized in an well equipped center with facilities for blood transfusion, emergency cesarean section and neonatal care unit.

A. Massive Haemorrhage

Following resuscitative measures are started immediately in massive haemorrhage. Simultaneously prepare the patient for termination of pregnancy by vaginal/cesarean section depending on the cause of bleeding.

Nonpharmacological

1. Establish intravenous line (one or two 14/16 gauge cannula)
   a. Draw 20 ml blood for cross-match, haemogram, coagulation profile.
   b. Start fluid therapy rapidly as described below.
2. Head down tilt, keep the patient warm.
3. Oxygen by mask at 8 liters/minute.
4. Empty bladder (Foley's catheter for urine output).

Pharmacological

1. IV fluids and blood replacement therapy (For details see section on shock).
2. Definitive treatment is termination of pregnancy by cesarean section

in cases of placenta previa and by vaginal/cesarian section in cases of abruptio placentae.

B. Mild APH

Expectant management: In a case of placenta previa without maternal and foetal compromise, expectant management is planned if pregnancy is less than 37 weeks and patient is not having active bleeding and labor pains.

1. Hospitalize and bed rest with foetal & maternal monitoring.
2. Inj. Dexamethasone 12 mg IM 12 hourly for 2 doses should be given for foetal lung maturity.
3. Definitive treatment is termination of pregnancy in case of following: occurrence of life threatening bleeding, pregnancy > 37 weeks, patient is in labor, in all cases of abruptio placentae, baby is dead, congenitally malformed baby and bleeding recurring or premature rupture of membranes on expectant management leading to maternal or foetal compromise.

a. Indications for cesarean section are: Major degree placenta previa, non vertex presentation, in case of abruptio placentae with live foetus if cervix is unfavourable (labor is likely to be longer than 6 hours), failure to progress after amniotomy and oxytocin infusion and other obstetrical indications for cesarean section.

b. Indications for vaginal delivery in APH are: Minor degree placenta previa with vertex presentation and slight bleeding with favorable cervix and abruptio placentae with favorable cervix and with mild to moderate bleeding.

For induction artificial rupture of membranes followed by oxytocin infusion is done. Oxytocin infusion is continued in the postpartum period to prevent postpartum haemorrhage. In abruptio placenta monitoring is done to detect maternal complication early (pulse, BP, urinary output, BT, CT, clot retraction time).

Patient education

- APH irrespective of type and cause results in increased perinatal morbidity and mortality.
- Incidence of placental abruption and placenta previa are both increased with increasing age and parity.
- Hypertension, cigarette smoking, cocaine abuse etc. predispose to placental abruption.

References

1. Antepartum Haemorrhage. In: Anesthetic and Obstetric Management of High Risk Pregnancy, Datta S (ed), 2nd Edition, 1996, Mosby.

2. Obstetric Haemorrhage. In: Intrapartum Obstetrics, Reptke JP (ed), 1996, Churchill Livingstone, pp 203-222.
3. Williams Obstetrics. F Gary Cunningham, Paul. MacDonald, Kenneth J Leveno, et al, (eds), 1997.

POSTPARTUM HAEMORRHAGE (PPH)

Postpartum haemorrhage is excessive blood loss from the genital tract after delivery of the foetus exceeding 500 ml or affecting the general condition of the mother.

Salient features

- Primary PPH i.e. bleeding within 24 hours of delivery is commonly due to atonic uterus (90% cases) or cervical/vaginal tears (traumatic PPH). It can also be due to occult uterine inversion, rupture uterus or coagulation defect.
- Abnormal bleeding can also occur between 24 hours and 6 weeks of delivery (secondary PPH) due to sepsis, retained placental bits, or placental polyp.
- PPH requires prompt and effective management, failing which it may result in complications like hypovolemic shock, coagulation failure, renal failure, hepatic failure, adult respiratory distress syndrome and may also result in maternal death.

Treatment

Patient should be assessed for general condition, amount of blood loss, whether placenta is expelled or not and condition of uterus whether contracted or atonic.

The following resuscitative measures are instituted immediately:

Nonpharmacological

Same as in APH. Monitor pulse rate, blood pressure, respiratory rate and urine output. While resuscitative measures are underway, a thorough clinical examination is made to ascertain the cause of PPH and definitive treatment is planned accordingly.

Pharmacological

Same as in APH and for details see section on shock.

Atonic PPH

Nonpharmacological

Placental removal with cord traction if already separated, uterine massage and bimanual compression.

Pharmacological

1. Oxytocin Infusion (10-40 units in 500 ml Ringer Lactate/Normal Saline at 125 ml/min).
2. Methyl ergometrine maleate 0.2 mg IV, may be repeated IM after 5-10 min. (**CAUTION**: Contraindicated in heart disease, hypertension).
3. If bleeding is not controlled 15-Methyl $PGF_{2\alpha}$ 0.25 mg IM/ intramyometrial, may be repeated every 15-90 min up to a maximum of 2 mg. (**CAUTION**: Contraindicated in bronchial asthma, epilepsy).

Indication for referral: If patient is still bleeding despite medical therapy and if facilities for transfusion and further management are not available arrange for transfer to a higher center. Intrauterine packing or irrigation with hot saline may be done in the mean time.

Surgical treatment

Retained placenta	-	Manual removal of placenta under general anaesthesia (GA)
Cervical/ vaginal tears	-	Exploration and repair
Rupture uterus	-	Laparotomy with repair/ hysterectomy
Uterine inversion	-	Reposition under GA
Atonic PPH not controlled with medical measures	-	Laparotomy with uterine artery ligation Internal artery ligation/Hysterectomy

Patient education

- Higher parity and previous atonic PPH predispose to PPH.
- Hospital delivery is mandatory in women with PPH in a previous pregnancy.

References

1. Postpartum Haemorrhage. In: American College of Obstetricians and Gynaecologists, ACOG Technical Bulletin no. 243. Washington, DC, 1998.
2. The Management of Postpartum Haemorrhage. In: Scottish Obstetrics Guidelines and Audit Project, 1998.
3. Williams Obstetrics. F. Gary Cunningham, Paul. MacDonald, Kenneth J Leveno, et al, (eds), 1997.

VAGINAL DISCHARGE

Vaginal discharge can occur due to vaginitis alone or cervicitis. Causative organisms for vaginitis are *Trichomonas*, *Candida albicans*, *Gardenella vaginalis* and for cervicitis are *Neisseria gonorrhoeae* and *Trichomonas vaginalis*.

Salient features

- A per-speculum examination is necessary in all patients.

A. Treatment (Cervicitis)

Nonpregnant

1. Inj. Ceftriaxone 250 mg IM as a single dose

   Or

   Tab. Ciprofloxacin 500 mg as a single dose
2. Cap. Doxycycline 100 mg twice a day for 7 Days

   Or

   Cap. Tetracycline 500 mg every 6 hours for 7 days

   Or

   Cap. Azithromycin 1 g OD for 7 days.

In Pregnancy

Tab. Erythromycin 500 mg every 6 hours for 7 days
(Tetracycline/Doxycycline are contraindicated).

B. Trichomonal Vaginitis

Generally sexually transmitted, but non-sexual contact and fomite transmission also occurs.

Salient features

- Patient may be asymptomatic or have frothy, copious, malodorous white, grey, yellow or green discharge, vaginal soreness, dysuria or dyspareunia.
- On local examination, vulva and vagina may be oedematous, red and painful.
- Diagnosis is based on identification of the protozoan on a saline wet mount. Vaginal pH is between 5–7. Flagellates are seen in wet mount.

Treatment

Pharmacological

Tab. Metronidazole 2 g as a single dose or 500 mg 2 times a day for 7 days or 400 mg 3 times a day for 7-10 days.

Or

Tab. Tinidazole 2 g as a single dose.

Treatment of partner should be undertaken simultaneously.

Mixed infection with candida or gardenella is common, therefore may be managed with respective oral therapies or combined (Clotrimazole + Tinidazole) vaginal pessaries as in vulvovaginal candidiasis.

C. BACTERIAL VAGINOSIS

Mode of transmission is probably sexual.

Salient features

- Malodorous, thin grey white vaginal discharge. Local irritation is uncommon. Vaginal pH is between 5 and 6.
- Diagnosis is based on demonstration of clue cells on a saline wet mount or a fishy odour on adding 10% KOH to the discharge on a glass slide.

Treatment

Same as for trichomonal vaginitis.

D. VULVOVAGINAL CANDIDIASIS

May be sexually transmitted or as an opportunistic infection from endogenous flora. Predisposing factors include pregnancy, oral contraceptives, diabetes mellitus, use of broad spectrum antibiotics, altered cellular immunity (congenital and acquired e.g. HIV), synthetic-tight undergarments that promote moist and warm local environment.

Salient features

- Pruritus vulva, thick white floccular (cottage cheese) vaginal discharge, dysuria, dyspareunia, and local burning sensation.
- Diagnosis is based on clinical features, wet mount and culture. Vaginal pH is below 4.5. Pear shaped motile pseudohyphae with spores are seen in wet mount.

Treatment

Nonpharmacological

Treatment is aimed towards controlling predisposing factors.

Pharmacological

1. Vaginal Tab. Nystatin (1,00,000 units), 1-2 tablets intra-vaginally HS for 2 weeks (safe in pregnancy)

   Or

   Vaginal pessary Clotrimazole 100 mg HS for 6 days (Alternatively, 200 mg HS for 3 days or 500 mg once). Creams are also available for both vagina and vulva (Safe during pregnancy).

Or

Tab. Ketoconazole 200 mg twice a day 2 times a day orally for 5 days (**CAUTION**: Contraindicated during pregnancy, high doses can cause fulminant hepatitis)

Or

Tab. Fluconazole 150 mg orally once and repeat weekly for 3 weeks in chronic cases (**CAUTION:** Contraindicated during pregnancy).

Patient education

- Generally sexually transmitted, but nonsexual contact and fomite transmission also occurs.

Reference

1. Gynaecology, Robert W Shaw, W Patrick Soutter, Stuart L Stanton, (eds), 2nd Edition, 1997, Churchill Livingstone.

PELVIC INFLAMMATORY DISEASE (PID)

PID is a spectrum of infections involving female upper genital tract i.e. cervix, uterus, tubes, ovaries and pelvic peritoneum. The disease may have acute or chronic presentation. Most cases of acute PID are the result of polymicrobial infection. The commonest cause is sexually transmitted diseases and other causes are post abortal & puerperal sepsis, operative procedures like dilatation and curettage, endometrial biopsy, insertion of intrauterine device.

Salient features

- Lower abdominal pain, cervical motion tenderness & adenexal tenderness, fever, cervical discharge and leucocytosis.
- In severe cases patient may be toxic with high-grade fever, vomiting, dehydration, and abdominal distension.
- Long term sequelae can be infertility, ectopic pregnancy, chronic pelvic pain and even mortality can occur in case of ruptured tubo-ovarian abscess.
- Failure of acute PID to resolve completely results in chronic PID with features of severe, persistent & progressive pelvic pain, repeated acute exacerbation of PID, tubo-ovarian inflammatory mass, dyspareunia or bilateral ureteral obstruction from ligamentous cellulitis.

Treatment (Acute PID)

The patient can be treated as an outpatient or hospitalized depending on the severity of clinical features.

Outpatient treatment

Patient of mild PID with slight pain & tenderness, without toxic features like high-grade fever, vomiting, abdominal distension can be managed as outdoor patients with the following drug regimens:

Pharmacological

Either of the following two regimens can be given.

A. Regimen A

1. Inj. Cefoxitin 2 g IM, plus Probenecid 1 g orally, as a single dose.
   Or
   Inj. Ceftriaxone 250 mg IM as a single dose.
   Or
   Inj. Ceftizoxime or Cefotaxime 500 mg IM as a single dose.
2. Cap. Doxycycline 100 mg 2 times a day for 14 days.

B. Regimen B:

1. Tab. Ofloxacin 400 mg oral 2 times a day for 4 days.
2. Tab. Clindamycin 450 mg oral 4 times a day for 14 days.
   Or
   Tab. Metronidazole 500 mg 2 times a day for 14 days.

Follow up after 2 - 3 days of initiation of therapy patient is reevaluated for clinical response. If poor response, patient is to be admitted for intravenous antibiotics.

Indoor treatment

If diagnosis is uncertain and surgical emergencies such as appendicitis & ectopic pregnancy cannot be ruled out, patient is pregnant, post abortal or puerperal and if the patient is adolescent (among adolescents, compliance with therapy is unpredictable), severe illness or nausea & vomiting, HIV positive, unable to follow or tolerate an out patient regimen and outpatient therapy failed.

Bed rest.

Hydrotherapy, if febrile.

IV fluids in cases of vomiting and dehydration and correction of electrolyte imbalance.

Investigate and obtain haemogram with ESR, LFT, KFT, serum electrolytes, blood culture, endocervical swab culture, ultrasonography if adenexal mass. Monitoring by clinical condition, vital monitoring, signs and symptoms of pelvic abscess and peritonitis.

Pharmacological

Either of the following regimens may be instituted at the earliest without waiting for culture reports.

A. Regimen A:

1. Inj. Cefoxitin 2 g IV every 6 hours.
   Or
   Inj. Cefotetan 2 g IV every 12 hours.
2. Inj.Doxycycline 100 mg IV or orally every 12 hours.
3. Inj. Metronidazole 500 mg IV 8 hourly.

B. Regimen B:

1. Inj. Clindamycin 900 mg IV every 8 hours.
2. Inj. Gentamicin 2 mg/kg IV followed by 1.5 mg/kg every 8 hours.
3. Inj. Diclofenac sodium 75 mg deep IM 8 hourly.
   Or
   Inj. Paracetamol 500 mg IM SOS.
4. Inj. Metronidazole 500 mg IV 8 hourly.

Injectable regimen should be continued for at least 48 hours after the patient demonstrates clinical improvement (becomes afebrile, decrease in lower abdomen and pelvic tenderness, improvement in constitutional symptoms). After this, Doxycycline 100 mg 2 times a day orally or Clindamycin 450 mg oral 4 times a day should be continued for total of 14 days.

Clinical improvement should occur within 3 days of initiation of therapy. Consider further diagnostic tests/laparoscopy if symptoms do not improve or worsen.

Different procedures may be required in the following situations:

- Colpotomy for drainage of midline pelvic abscess.
- Dilatation & evacuation of septic products of conception in post abortal sepsis.
- Laparotomy in cases of pyoperitoneum, resistant peritonitis, intestinal obstruction, ruptured tubo-ovarian abscess, enlarging pelvic mass despite medical therapy,
- Laparoscopy: if diagnosis is uncertain, in cases of no response to treatment, to reconfirm the diagnosis, obtain cultures from cul de sac and fallopian tubes and drain pus if necessary.

Treatment of the sexual male partner

Asymptomatic male partner:

Inj. Ceftriaxone 125 mg IM followed by oral Doxycycline 200 mg 2 times a day for 14 days.

Treatment (Chronic PID)

Chronic PID can also be caused by pelvic tuberculosis (see below).

Treatment of chronic PID is surgical. Type of surgery is decided considering pathological lesion, patient's age, and desire for child bearing. Definitive surgery is total abdominal hysterectomy with bilateral salpingo-oophorectomy, but in young females conservative surgery is preferred.

Treatment (Pelvic tuberculosis)

Primary treatment is medical therapy with anti tubercular drugs for 6 months. Daily dose of the drugs is:

1. Tab. Isoniazid 5 mg/kg (maximum 300 mg).
2. Cap. Rifampicin 10 mg/kg (maximum 600 mg).
3. Tab. Pyrazinamide 15-30 mg/kg (maximum 2 g).
4. Cap. Ethambutol 15-25 mg/kg (maximum 2.5 g).

(for details see section on tuberculosis)

All these 4 drugs are given in the initial phase for 2 months followed by INH and rifampicin for 4 months.

Indication of surgery are: primary unresponsiveness, persistence or enlargement of adenexal mass after 4 - 6 months of treatment, persistence or recurrence of pelvic pain on treatment. Definitive surgery is total abdominal hysterectomy with bilateral salpingo-oophorectomy.

Patient education

- Emphasize behavioural and contraceptive methods to prevent the acquisition of STDs.
- Patients must be encouraged to complete the recommended antibiotic treatment for the full 14 days.
- Sexual abstinence until complete treatment. Sexual partner of patient diagnosed with PID must be treated to prevent reinfection.

References

1. Guidelines for Treatment of Sexually Transmitted Diseases. Centers for Disease Control and Prevention. In: MMWR Morb Mortal Weekly Rep 1998 Jan 23; 47(RR-1): 1-111
2. Pelvic Inflammatory Disease. In: Te Linde's Operative Gynaecology, John A Rock, John D Thompson (eds), 1997, pp 657 - 686.

PREMENSTRUAL SYNDROME (PMS)

It is a cyclic recurrence of physical, psychological or behavioural symptoms that appear after ovulation and resolve after the onset of menstruation. PMS requires treatment when the symptoms are severe enough to interfere with the woman's life style, relationships & occupational functioning.

Salient features

- Common somatic symptoms include feeling of bloating, body aches, breast tenderness, headache, food cravings & poor concentration. Emotional symptoms include emotional hypersensitivity, depression, irritability, mood swings, anxiety, tension, fear of loss of control & confusion.
- Diagnosis is confirmed by excluding the concomitant medical or psychiatric disorders with which it may be confused (depending on the symptoms).

Treatment

Non pharmacological

Life-style advice should be offered to all women as first line of treatment.

1. Daily charting of symptoms for two months.
2. Dietary modifications like: increase complex carbohydrate meals, reduce or eliminate, especially in the luteal phase, salts, chocolate, caffeine & alcohol, and several small meals per day.
3. Moderate regular aerobic exercise like brisk walk 1-2 miles per day for 4-5 days/week.
4. Stress management courses/counselling.

Pharmacological

1. Tab. Pyridoxine 100 mg/day for 10-14 days (during luteal phase). (maximum daily dose is 150 mg)

   Or

   Tab. Evening primrose oil 500 mg 3 times a day.
2. In case of headache or premenstrual dysmenorrhoea,
   Non steroidal antiinflammatory drugs - like mefenamic acid 500 mg 3 times a day for duration of symptoms till onset of menstruation.
3. In case of predominantly physical symptoms (bloatedness, irritability swelling, weight gain, breast tenderness),
   Tab. Spironolactone 100 mg/day for

   Or

   Tab. Bromocriptine 1.25 - 5 mg/day in the luteal phase for mastalgia. Common side effects are nausea and vomiting. Tablet can be given vaginally if side effects are very severe.

If no relief in symptoms with above measures in 2 - 3 cycles and symptoms are predominantly emotional, then the following drugs are used preferably in consultation with a psychiatrist:
Tab. Fluoxetine 5 - 20 mg/day.
In non responders to the above therapy, ovulation suppression may be

beneficial. Any of the following can be used:
Low dose combined oral contraceptive pills, 1 pill daily from 5^{th} to 25^{th} day of the cycle.

Or

Progestins: Medroxyprogesterone acetate (MPA) 15 - 30 mg/day (10 mg 3 times a day) or Depot MPA 150 mg IM 3 monthly. Irregular bleeding is very common.

Or

Tab. Danazol 200-800 mg/day. Side effects like weight gain, facial hair, acne are the usual limiting factors.
Treatment may be stopped after 3 - 6 cycles and look for return of the symptoms. If symptoms return treatment is required till menopause. If no response to the above treatment refer to a higher centre.

Patient education

- Explain the importance of the life-style modification.

References

1. Clinician's Approach to the Diagnosis & Management of Premenstrual Syndrome. In: Clinical Obstet Gynaecology, 1992, pp 637-657.
2. Hormonal Manipulations in the Treatment of Premenstrual Syndrome. In: Clinical Obstet Gynaecology, 1992, pp 658-666.
3. Premenstrual Therapy. In: Clinical Obstet Gynaecology, 1998, pp 405-421.
4. Premenstrual Syndrome. In: Gynaecology, Robert Shaw, Pat Soutter, Stuart Stanton (eds), 1992, pp 325-340.

DYSFUNCTIONAL UTERINE BLEEDING (DUB)

It is abnormal uterine bleeding in the absence of organic disease of the genital tract.

Salient features

- Disturbances of the menstrual cycle, regular and irregular uterine bleeding and alteration in the amount or duration of the menstrual blood loss.
- Commonly due to anovulatory cycles but can occur in the ovulatory cycles also. Anovulatory cycles are usual in postmenarche and premenopausal age groups and are usually irregular, variable in duration and amount of bleeding.
- Ovulatory DUB is more common in the age group of 20 - 40 years and present as cyclical menorrhagia.

Treatment: Acute bleeding (First episode)

A. Severe bleeding (haemodynamically unstable patient)

1. Usual steps taken for any serious haemorrhage should be instituted immediately like IV line, fluid replacement, blood transfusion, oxygen inhalation and monitoring of vitals.
2. Dilatation and Curettage is the quickest way to arrest bleeding except in cases of puberty menorrhagia where medical management is preferred.

B. Less severe bleeding (haemodynamically stable patient)

High dose Progestogens: Norethisterone 10 mg 3 times a day until bleeding stops (not >3 days) followed by Norethisterone 5-10 mg or Medroxyprogesterone acetate 10 mg per day for 21 days. Withdrawal bleeding will occur after 2-4 days of stopping the drug and will stop in 4-5 days.

Or

Combined oral contraceptive pills (OCs) containing 50 mcg ethinyl estradiol 1 pill 2 times a day for 7 - 10 days followed by progestins for 7-10 days, will be followed by withdrawal bleeding.

C. If bleeding is not controlled with progestogens, patient is having heavy bleeding for many days, endometrial curettage yields minimal tissue, or when the patient has been on progestogen medication (OC's or Depot MPA) and the endometrium is shallow and atrophic.

Treatment schedules of high dose estrogens, depending on the severity of the bleeding the following can be used.

1. Conjugated estrogen 25 mg IV every 4 hr till bleeding abates or for 12 h. Progestin treatment is started at the same time.
2. Oral treatment conjugated estrogen 1.25 mg or 2 mg estradiol valerate given orally every 4 h for maximum of 24 h followed by single daily dose for 7-10 days.

All treatments must be followed by progestin coverage (10 mg MPA daily) along with estrogen for 7 days.

Monitoring

Clinical monitoring by vital charting and observation of blood loss per vaginum.

Treatment of Chronic DUB (Not actively bleeding)

1. Iron therapy: elemental iron maximum 60 mg 3 times a day depending on the degree of anaemia.

A. Anovulatory DUB

1. If contraception is desired: OCPs for 3 - 6 cycles Or Norethisterone 5-10 mg.

2. Medroxyprogesterone acetate (MPA) 10 mg 16-25th day of the cycle for 3-6 cycles.
3. In cases of endometrial hyperplasia without atypia on histology Norethisterone acetate 5 mg or MPA 10 mg 5-25th day of cycle for 3-9 cycles followed by repeat endometrial biopsy.
4. If fertility desired: ovulation induction is advised.

B. Ovulatory DUB

NSAIDS: Mefenamic acid 500 mg 3 times a day for 3 -5 days during periods.

Or

Oral combined contraceptive pills if contraception is desired.

If the above treatment is not effective in first cycle patient should be referred for tertiary care by a gynaecologist. Following treatment can be considered as an alternative to surgery:

Tab. Danazol 200 mg daily for 3 months.

Follow up

Follow up is done after 1, 3, 6 months of therapy. Treatment is stopped after 3-6 months. If symptoms recur medical treatment is to be continued or surgery can be offered.

Role of surgery

Endometrial curettage

- Acute bleeding in haemodynamically unstable patient to quickly control the bleeding.
- In acute episode if bleeding doesn't decrease significantly in 12-24 hours with medical treatment, then reevaluation is mandatory and surgical curettage should be done.
- If age is >35 years - premenstrual dilatation and curettage for endometrial histology is a must to rule out endometrial pathology.

Definitive therapy

If medical therapy is not effective then endometrial ablation or hysterectomy is to be performed.

Patient education

- In majority of patients, medical management cures the problem.
- Common side effects of high dose estrogens are: nausea, vomiting, headache, depression, and fluid retention. Contraindicated in liver disease, history of thromboembolic disorder, cardiovascular disease, and estrogen dependant neoplasm.
- Common side effects of progestogens are depression, fluid retention, fatigue, insomnia, dizziness, nausea, and breast tenderness.
- Common side effects are acne, weight gain, fluid retention, hoarseness of voice.

References

1. Dysfunctional Uterine Bleeding, In: Clinical Gynecologic Endocrinology & Infertility, Leon Speroff, Robert H Glass, Nathan G Kase (eds), 1994, pp 531 - 546.
2. Menstruation & Menstrual Abnormality. In: Gynaecology, Robert Shaw, Pat Soutter, Stuart Stanton (eds), 1992, pp 189-204.

MENOPAUSE

Permanent cessation of menses for 1 year is known as menopause. It usually occurs between 40 to 50 years, mean age being 48 years. Long term consequences due to decreased estrogens can be rise in the risk of ischaemic heart disease due to adverse effects on lipid profile and osteoporosis and pathological fractures.

Salient features

- Hot flushes, night sweats, palpitations, vaginal dryness, itching, atrophy of the breast and skin, urethral syndrome, stress incontinence, mood changes like anxiety, irritability, depression, insomnia and joint pains.
- Diagnosis is always clinical, however, in doubt endocrine evaluations for serum FSH levels & serum estradiol levels may be helpful.

Treatment

Nonpharmacological

- Balanced diet with fruits, vegetables, semi-skimmed milk adequate in vitamins and minerals. A reduction or avoidance of smoking and alcohol consumption.
- Exercise: walking or swimming for 20-30 min every day.

Pharmacological

1. Tab. Calcium 1000 mg daily.
2. Hormone replacement therapy (HRT). Rule out contraindications to HRT namely present endometrial/breast cancer, acute phase myocardial infarction, undiagnosed breast lump/abnormal vaginal bleeding and acute liver disease. Hypertension and diabetes if present should be controlled before HRT is prescribed.

Estrogen therapy.

a) Single therapy with estrogens in hysterectomized patients.
Conjugated equine estrogen 0.625 -1.25 mg.

Or

Estriol 1-2 mg is given daily 1-25th day every month or daily without

any break. If symptoms recur during drug free period then give continuous therapy.

Or

Transdermal estradiol patch 50 or 100 mcg/day applied twice a week away from breast, preferably on the shaved skin of buttock, thigh or legs. (Limiting factor is local skin reactions).

Transdermal estradiol patch is preferred in case of gall bladder disease, hypertriglyceridemia, history of thromboembolism, poorly-controlled hypertension, recent myocardial infarction, vascular diseases, migraine, chronic hepatic dysfunction, malabsorption syndrome.

b) Combined therapy with estrogens and progestin in women with intact uterus.
   i. Estrogen therapy as above.
   ii. Progestogen-Medroxyprogesterone acetate 5 - 10 mg or Dihydrogesterone 10 - 20 mg or Norethisterone 2.5 mg) or 200 ml micronized Progesterone is added from 13th to 25th days in cyclic sequential regimen and 1st to 12th of every month in continuous sequential regimen. If withdrawal bleeding is not acceptable then give continuous combined treatment (0.625 mg conjugated equine estrogen + 2.5 mg Medroxy progesterone acetate or 1 mg micronized estrogen + 100 mg micronized progesterone).

If conventional HRT is contraindicated

Tab. Tibolone 2.5 mg per day (major side effects are weight gain, oedema, breast tenderness, GIT symptoms and vaginal bleeding).

In symptomatic elderly women with atrophic vaginitis and other urogenital symptoms do not desire long term HRT:

Estriol cream daily application of 0.5 g delivering 0.5 mg of estriol for 3 weeks followed by twice weekly application for 3 - 4 weeks.

Key indicators of response to therapy are improvement in symptoms. Follow up at 2-3 months then at 6 monthly intervals. Yearly mammography, Pap's smear, pelvic USG and serum estradiol are advisable.

The appropriate duration is lifelong, otherwise at least for 5-6 years. HRT should be started as early as possible after menopause.

Patient education

- Explain the patients that following side effects due to estrogens can occur: fluid retention, breast tenderness, nipple sensitivity, nausea, headache, leg cramps. Side effects due to progestogens are fluid retention, breast tenderness, oedema, headache, acne, premenstrual syndrome, abdominal cramps, vaginal bleeding.

- Explain the patient that the appropriate duration is lifelong, otherwise at least for 5-6 years. HRT should be started as early as possible after menopause.
- Follow up visits at 2 - 3 months then at 6 monthly intervals are necessary.

References

1. Treatment of the Post Menopausal Woman: Basic & clinical aspects. Rogerio A Lobo (ed), Lippincott Williams & Wilkins, 1999.
2. Menopause & Postmenopausal Hormone Therapy. In: Clinical Gynaecologic Endocrinology & Infertility, Leon Speroff, Robert H Glass, Nathan G Kase (eds), 1994, pp 583-650.
3. The Menopause. In: Gynecology. Robert Shaw, Pat Soutter, Stuart Stanton (eds), 1992, pp 341-354.

CONTRACEPTION

A method or a system, which allows intercourse and yet prevents conception, is called a contraceptive method. This contraception may be temporary when the effect lasts only till the couple uses the method but the fertility returns after the use is discontinued. The permanent contraceptive methods are surgical and are aimed to achieve sterility after the surgical procedure.

A couple in the reproductive age group, who desires contraception should be provided information about all the available methods of contraception and should be counselled & helped so as to choose a method most suitable for that couple. Various contraceptive methods available are:

I. Temporary methods

A. Hormonal contraceptives
- Combined oral contraceptive pills.
- Injectable hormonal contraceptives (DMPA and NET-EN).

B. Non hormonal contraceptive pills
- Centchroman.

C. Intrauterine contraceptive device
- CuT 200B.
- Multiload 280 and Multiload 375.
- CuT 380A.

D. Barrier methods
- Male condoms.
- Vaginal diaphragms with spermicidal jelly.
- Contraceptive sponge.

II. Permanent methods

A. Female sterilization

- Postpartum sterilization.
- Interval ligation (laparoscopic or minilap ligation).
- Ligation concurrent with MTP.

B. Male sterilization
- Vasectomy (traditional or non scalpel).

I. Temporary methods

A. (i) Combined oral contraceptive pills

Any of the low dose combined oral contraceptive pill containing 30 mcg Ethinyl estradiol and a Progestin (0.3 mg Norgestrel or 0.15 mg Norgestrel or 0.15 mg Desogestrel) can be prescribed. One tablet to be taken daily with meals at consistent time. It should be started during first seven days of the menstrual cycle or at any other time when it is reasonably certain that she is not pregnant. If started after first 7 days of menstrual cycle, back up method (abstinence or barrier method) should be used for 7 days. Pills should be taken for three weeks followed by 1 week of pill-free interval during which placebo tablets are to be taken if pack contains 28 tablets.

In women >40 years of age very low dose pills containing Ethinyl estradiol 20 mcg and desogestrel 0.15 mg can be used. After age 50 years, if woman on oral pills, check FSH during 5 - 7 days of pill free interval. If FSH >30 IU/l change to HRT regimens.

Contraindications

Combined oral contraceptive pills are contraindicated in cases with current or history of

- thromboembolic disease, cerebrovascular disease, coronary artery disease.
- complicated valvular heart disease.
- acute liver disease.
- current or past breast cancer.
- undiagnosed vaginal bleeding.
- pregnancy.
- heavy smokers over 35 years of age.
- migraine with neurological symptoms.
- diabetes >20 years or with vascular disease.
- current gall bladder disease.
- uncontrolled hypertension (BP $\geq$160/100).

Should not be taken during first 6 months postpartum if breast feeding and first 3 weeks postpartum in non-breast feeding females. Pills can be started immediately after spontaneous or induced abortion. Can be used with caution in cases with controlled hypertension, diabetes, migraine without neurological symptoms, non-smokers with age more than 35 years of age without any other medical illness.

Follow up - First follow up should be within 3 months and then annually. Follow up involves history, blood pressure, urinalysis, breast examination, liver palpation & pelvic examination.

Patient education

Common side effects are nausea, vomiting, GI upset, breast changes, weight gain, acne, breakthrough bleeding, amenorrhea, rash, vaginal candidiasis. Side effects decrease usually after 2 - 3 months of use.

- Report immediately to the clinician in case of symptoms like chest pain, leg pain, severe headache, severe stomachache, swelling of one or both legs, visual impairment.
- It is one of the most effective contraceptive methods with failure rate about 0.1%.
- It has non-contraceptive health benefits like regular periods with less pain and bleeding, improves premenstrual symptoms, and decreases functional ovarian cysts, pelvic inflammatory disease, ovarian and endometrial cancer, endometriosis.
- **Forgotten pill -** if one pill is forgotten, take as soon as remembered and next day take next pill and continue the schedule. Use back up method for 7 days.
- If 2 pills are forgotten take 2 pills and next day again take 2 pills, then continue as per schedule. Use back up method for 7 days.
- If 3 pills are forgotten, discard rest of the pack, use back up method for 7 days and then restart with new pack.
- Should be discontinued at least 4 weeks prior to any planned major surgery.
- Medicines like rifampicin, barbiturates, phenytoin, carbamazepine, primidone, griseofulvin interfere with the effects of oral pills. So use alternative method during their intake.

(ii) Injectable hormonal contraceptives

Highly effective estrogen free long acting contraceptive not linked to coitus. Can be given in women where estrogens are contraindicated like sickle cell disease, seizure disorders, age>35 years who smoke. Can be given in breast feeding females after first 6 weeks. In non-breast feeding females, injections can be safely given immediately postpartum.

Depot Medroxy Progesterone Acetate - 150 mg injection to be given deep IM every three months. Next injection can be delayed by 2 weeks

Or

Norethisterone enanthate - 200 mg injection to be given deep IM every 2 months. Next injection can be delayed by 1 week.

Absolute contraindications are

- Pregnancy.

- unexplained genital bleeding.
- severe coagulation disorder.
- previous sex steroid induced liver adenoma, active liver disease.
- breast feeding during initial 6 weeks.
- current or history of thromboembolic disease, cerebrovascular disease, coronary artery disease.
- current or past breast cancer
- diabetes >20 years or with vascular disease
- uncontrolled hypertension (BP ≥180/110).

Patient education

- Common side effects are irregular bleeding, breast tenderness, weight gain, depression, headache, dizziness, abdominal pain.
- Beneficial effects and efficacy is same as that of oral contraceptive pills.
- Fertility return is slightly delayed after discontinuation of use.
- Drug interactions are same as with oral hormonal pills.

B. Nonhormonal oral contraceptive pills

Centchroman

30 mg tablet started on first day of periods. Take twice weekly for three months and then continue as once weekly.

Contraindications

Polycystic ovarian disease, cervical intraepithelial neoplasia, severe allergy, recent history of liver disease, and first 6 months of lactation.

Patient education

- It is a non-steroidal contraceptive pill. It has no hormonal effects.
- Failure rate is 1-2%.
- Delayed periods can occur in 6% cases. If delay is >15 days, perform urine pregnancy test.
- If one tablet is missed take as soon as possible & resume scheduled intake. Add back up method till next period. If tablet missed for >7 days, start fresh regimen.

C. Intrauterine contraceptive devices (IUCD)

Any of the following devices can be inserted inside uterus by a trained health personnel. It should be inserted during or shortly after menstruation during the follicular phase of menstruation. After spontaneous or induced abortion IUCD can be inserted immediately. After delivery it should be inserted during 4 - 8 weeks postpartum. It can be inserted within 5 days of unprotected coitus. These devices need to be changed after the duration of their life span.

CuT 200 B	3 years
Multiload 250	3 years
Multiload 375	5 years
CuT 380 A	5 years

Follow up - first follow up should be after next period to check for complications and to rule out expulsion. After that follow up annually.

Contraindications

Pregnancy, postpartum >4 weeks, septic abortion, distorted uterine cavity, uterine fibroids, current or within past 3 months PID or STD, increased risk of STD, HIV positive, AIDS, pelvic tuberculosis, unexplained vaginal bleeding, trophoblastic disease, genital tract malignancy, complicated valvular heart disease.

Patient education

- Common side effects are increased menstrual bleeding and dysmenorrhea. These decrease after initial 2-3 months.
- No protection for STDs.
- Failure rates are 0.5 - 3%. Ectopic pregnancy can still occur.
- IUCD can be spontaneously expelled. Therefore monthly palpation of IUCD string is important. If not palpable, report immediately.

D. Barrier methods

These are cheap, over the counter available, coitus dependant methods. Male condoms, vaginal diaphragm, spermicidal jellies, vaginal sponge can be used.

Male condoms

Any of the available condoms can be used. For each act of coitus a new condom is to be used. If during intercourse, condom breaks or if there is spillage or leakage, woman should contact a clinician within 72 hours and emergency contraception should be provided to her.

Contraindications

Only contraindication is in cases with severe allergy to latex rubber.

Vaginal diaphragm

Available in different sizes. Proper size should be checked by a clinician by pelvic examination. Can be inserted 6 hours prior to intercourse. About a tablespoonful of spermicidal cream or jelly should be placed in the dome of diaphragm prior to insertion. Should be left in place for approximately 6 hours (but not >24hours) after coitus. Additional spermicide should be placed in vagina before each additional episode of sexual intercourse. After removal wash with soap and water, rinse and dry.

Follow up - annually to assess proper fitting of diaphragm.

Contraceptive sponge

Contains spermicidal agent Nonoxynol 9. It should be removed at least 6 hrs after sexual intercourse. Maximal wear time is 30 hours.

Patient education

- Barrier methods provide protection against STD's and PID. Only condom has been proven to prevent HIV infection.
- Other advantages are prevention of diseases like pelvic inflammatory disease, carcinoma cervix, chronic pelvic pain.
- It can be used soon after delivery.
- No hormonal side effects.
- Side effects like vaginal dryness, itching, irritation, allergic reactions can occur.
- Failure rates are very high. Typical failure rates are with condoms 14%, diaphragm with spermicidal jelly 20%, highest with sponge 28%.

II. Permanent contraceptive methods

Permanent contraception is provided by sterilization operation in male or female partners.

Male client should be <60 years of age.

Female client should be >22 years and <45 years of age.

Client must make informed decision voluntary and must give consent on the consent form for sterilization.

A. Female sterilization

Can be done by laparoscopic ligation in interval ligation and first trimester abortions or tubectomy.

Timing

- Interval sterilization - within 7 days after menstrual period is over.
- Post partum sterilization - after delivery till 7 days but preferably within 48 hours. Later on after 6 weeks postpartum.
- MTP - concurrently.
- Spontaneous abortion - concurrently but under antibiotic cover and in the absence of infection and anaemia.

Contraindications

There are no absolute contraindications. Relative contraindications are psychiatric disorder, acute febrile illness, jaundice, Hb< 8 g%, chronic systemic disease, malignancy, bleeding disorder, severe nutritional deficiency. Postpartum sterilization is contraindicated in puerperial sepsis or fever, severe preeclampsia/eclampsia, premature rupture of membrane >24 hours, severe APH or PPH, genital tract trauma.

Post abortal sterilization is contraindicated in sepsis, fever, haemorrhage, severe trauma, uterine perforation, acute haematometra.

Followup - first follow up should be done seven days after the surgery for wound examination. Second follow up is recommended after one month or next menstrual period whichever is earlier. Subsequent follow-ups if client develops any complication or has query.

B. Male sterilization

Contraindications

There are no absolute contraindications. Relative contraindications include psychiatric and physical illness, local genital conditions, including large varicocele, hydrocele, inguinal hernia, filariasis, cryptorchidism, previous scrotal surgery, intra scrotal mass.

Followup - first follow up after 7 days of surgery for wound examination and stitch removal. Second follow up after 3 months with semen analysis. Subsequent follow up required in cases of any complication or queries.

Patient education

- It is a safe and simple procedure.
- It is a permanent method to prevent future pregnancies.
- It does not affect sexual pleasure, ability or performance.
- It has a small chance of failure even if performed under optimum circumstances.
- After vasectomy it is necessary to use a back up contraceptive method either for 20 ejaculations or for a period of 3 months.
- Sterilization does not provide protection against reproductive tract infections/STDs or HIV/AIDS.
- Failure rates with female sterilization are < 0.5% and male sterilization < 0.1%.

Emergency contraception

Method used to prevent pregnancy after a likely fertile unprotected act of sexual intercourse. Can be used in cases of condom rupture, rape or other circumstances of unprotected sex.

First dose should be taken within 72 hours following unprotected sex and second dose 12 hrs after the first dose. Any of the following can be used:

Levonorgestrel 0.75 mg 1 tablet 12 hourly for 2 doses.

Or

Combined oral contraceptive pills containing 50 mcg Ethinyl estradiol with 0.5 mg Norgestrel 2 tablets 12 hourly for 2 doses.

Low dose combined oral contraceptive pills containing 30 mcg Ethinyl estradiol with 0.3 mg Norgestrel 4 tablets 12 hourly for 2 doses.

Or

Centchroman 50 mg 1 tablet 12 hourly for 2 doses.

Patient education

- Side effects are nausea, vomiting, dizziness, fatigue, headache, lower abdominal pain, breast tenderness, vaginal bleeding.
- It must be used under medical supervision.
- It decreases risk of pregnancy by 70 - 90%. Earlier it is taken, success is more.
- If vomiting occurs within 2 hours of the dose, it must be repeated.
- There are no contraindications for emergency contraception.
- After this use a barrier method for each act of intercourse until next menstrual period.
- If period delayed >5 days, rule out pregnancy.
- Use regular contraceptive method.

References

1. Improving Access to Quality Care in Family Planning Medical Eligibility Criteria for Contraceptive Use, 2nd Edition, World Health Organization, Geneva 2000.
2. Standards for Female and Male Sterilization, Ministry of Health and Family Welfare, Government of India, October 1999.
3. Clinical Gynaecologic Endocrinology & Infertility. Leon Speroff, Robert H. Glass, Nathan G. Kase (eds), 1994.

16
PSYCHIATRIC CONDITIONS

SCHIZOPHRENIA AND ACUTE PSYCHOTIC DISORDER

Schizophrenia is a psychotic disorder, characterized by disturbances in thinking, emotions and perception and disorganized behaviour. The illness tends to be chronic. Patients may present to a physician when they develop a physical or behavioural problem.

Salient features

- Socially disorganized behaviour, occasionally aggressive and violent roaming aimlessly.
- Talking irrelevantly, suspiciousness, thoughts of being harmed or controlled by some external agencies.
- Laughing, smiling or crying without any obvious reason.
- Muttering or talking to self or imaginary figures.
- Remaining quiet and withdrawn, neglecting personal care and disturbed sleep.

Symptoms of schizophrenia are often present for a long time varying from a few months to many years. In acute psychotic disorder duration varies from a few days to weeks.

Treatment

In patients already on treatment from a psychiatrist, the same may be continued. In others, the treatment as given below may be started but the patient should preferably be referred to a psychiatrist.

Initiation of therapy

In case of acute excitement or violent behaviour, the patient may be given

1. Inj. Haloperidol 5 mg IM Stat.
2. Inj. Promethazine chloride 25 mg IM. The Injection can be repeated after 8 hours.

Oral medication can be started as soon as the patient is willing to accept orally. Oral therapy is given as below.

1. Tab. Haloperidol 5-10 mg/day in 2 divided doses.

   Or

   Tab. Chlorpromazine 300 mg/day in 3 divided doses.

Or

Tab. Trifluoperazine 15 mg/day in 3 divided doses.

Or

Tab. Risperidone 4 mg/day in 2 divided doses.

2. Tab. Trihexyphenidyl 2 mg once in morning and once in afternoon (attempts may be made to taper it off after 3 months).
3. Tab. Diazepam or Nitrazepam 5-10 mg at bedtime may be given in the initial period for sleep disturbance (usually for 10-15 days, to be tapered off thereafter).

Improvement starts within one week. However, it may take few weeks to months for full response to come. If there is no improvement after one week, the patient should be referred to a psychiatrist.

Patient and family education

- Both the patient and the care givers to be educated that schizophrenia is a psychiatric illness, which can be effectively treated by medicines and needs long-term treatment, which may go on from one to many years in acute psychotic disorder.
- Provide psychological support to the family.
- Family not to criticize the patient and to be supportive.
- The medicine may cause mild to moderate side effects like sedation, slowness of movements, changes in facial expression and gait, rigidity, excessive salivation, dryness of mouth and constipation. Patient usually develops tolerance to these over few weeks. If the patient develops spasm of a part of body like neck or extremities or high-grade fever or alterations in sensorium, immediately contact the treating doctor or the psychiatrist.
- Treatment should not be stopped abruptly without the advice of the treating psychiatrist. Follow up is required weekly initially. Once the symptoms stabilize, frequency of follow-ups may be gradually reduced to once in fortnight to once in 1-3 months.

References

1. Expert Consensus Guideline Series Treatment of Schizophrenia 1999. The Journal of Clinical Psychiatry 60 Suppl 11.
2. Synopsis of Psychiatry, 8th Edition, 1999, BI Waverly, New Delhi.

BIPOLAR AFFECTIVE DISORDER

The illness is characterized by episodes of mania and depression or mania alone with intervening periods of normalcy. Patients may present to a physician when they develop a physical or behavioural problem.

Salient features

Episodes of mania are characterized by:

- Elevated, expansive or irritable mood, inflated self esteem, or grandiosity, decreased need for sleep, overtalkativeness, overactivity, interfering behaviour, and excessive involvement in pleasurable activities that have a potential of harmful consequences (buying sprees, sexual indiscretions).
- Symptoms should be present for a minimum duration of one week for a diagnosis of mania to be made. (For details about depressive episodes see section on depression).

Treatment

Treatment is for the current episode and for prophylaxis, since the episodes tend to recur. Prophylaxis is usually indicated, if there are more than 2-3 episodes in the previous 4-5 years.

In patients of bipolar affective disorder already on treatment, the same may be continued. In others, the treatment as given below may be started and the patient should be referred to a psychiatrist.

Current episode of mania

In case of acute excitement or violent behaviour, the patient may be given

1. Inj. Haloperidol 5 mg IM Stat.
2. Inj. Promethazine chloride 25 mg IM stat. Injection can be repeated after 8 hours.

Oral medication can be started as soon as the patient is willing to accept orally. Oral therapy is given as below.

1. Tab. Haloperidol 5-10 mg/day in 2 divided doses.

   Or

   Tab. Chlorpromazine 300 mg/day in 3 divided doses.

   Or

   Tab. Trifluoperazine 15 mg/day in 3 divided doses.

   Or

   Tab. Risperidone 4 mg/day in 2 divided doses.
2. Tab. Trihexyphenidyl 2 mg once in morning and once in the afternoon.
3. Tab. Diazepam or Nitrazepam 5-10 mg at bedtime may be given in the initial period for sleep disturbance (usually for 10-15 days, to be tapered off thereafter).

Improvement starts within one week. Treatment for the episode usually required for about 6 months. If the patient does not respond within one week, refer to a psychiatrist.

Current episode of depression

Line of treatment is similar to that as described under depression section.

Duration of treatment is relatively shorter than in major depression. Medications may be given for 2-3 months after the patient recovers from depression.

Prophylactic treatment

Tab. Lithium carbonate 900-1500 mg/day in 2-3 divided doses.

Or

Tab. Carbamazepine 600-1200 mg/day in 3 divided doses.

Or

Tab. Sodium valproate 600-1500 mg/day in 2-3 divided doses.

Note: Prophylactic treatment should only be given under psychiatric supervision. Prophylactic treatment may continue for a duration varying from 3 years to lifelong. Patients on lithium require regular blood levels monitoring.

Liver function test should be performed once in 6 months in patients on carbamazepine and sodium valproate.

Patient education

- General guidelines about the illness and medications similar to that for schizophrenia.
- Emphasize about recurrent course of illness and not to get too much worried on recurrences.
- Relapses can be treated as successfully as the first episode.
- When on lithium, advice to take plenty of fluids especially during summer; not to restrict salt.
- If fever, vomiting or diarrhoea develops while on lithium, reduce the dose of lithium to half and contact the physician or the psychiatrist.

References

1. Synopsis of Psychiatry, Kaplan HI & Sadeek BJ (eds), 8th Edition, 1999, BI Waverly, New Delhi.
2. Psychiatric Drugs. Lieberman JA, Tasman A (eds), 2000, Harcourt Asia: WB Saunders, Singapore.

DEPRESSION

Depression is one of the commonest psychiatric disorders. Patients often present to the general practitioners and the physicians. Patients of depression often present with vague somatic symptoms or aches and pains in general clinical practice.

Salient features

- Sadness of mood, joylessness, generalized lack of interest, anxiety is often associated.
- Lack of energy, slowness of thought, decreased concentration and efficiency.
- Lack of sleep, appetite and libido.
- Ideas of insufficiency, inadequacy and worthlessness, unexplained ideas of guilt, death wishes, suicidal ideas and suicidal attempt.
- Disruption of social and occupational functioning.
- Symptoms should be present for a minimum period of 2 weeks for a diagnosis of depression to be made.

Treatment

Nonpharmacological

- Counselling, reassurance, psychological support, encouragement.
- Cognitive therapy (to be given by a psychiatrist).

Pharmacological

Tricyclic antidepressants (TCAs) like Tab. Imipramine or Tab. Amitriptyline 75-150 mg/day in divided or a single dose; to be started at 25 mg twice a day, and increased by 25 mg every third day till 150 mg/day.

(Avoided in patients with epilepsy, heart disease, glaucoma, and benign prostatic enlargement).

Or

Cap. Fluoxetine 20-40 mg/day in 2 divided doses; starting with 20 mg/day which can be increased to 40 mg/day after 5-6 weeks in case of non response; always to be given in morning after breakfast.

Antidepressant medication begins to improve sleep, appetite and anxiety feelings within about one week. Feelings of depression may take from 2 to 4 weeks to improve. By about 12 weeks, most of the patients substantially improve. If no response to treatment seen in 5-6 weeks, review the diagnosis, and change the drug to a different class or refer to a psychiatrist.

For the first episode of depression, treatment needs to be continued for 6-9 months. Dose may be tapered off over a period of 6-8 weeks. However, if symptoms recur during this period, treatment needs to be continued for another 3-4 months. In case of multiple episodes of depression, treatment may need to be continued indefinitely.

In cases of bipolar depression, patients while on antidepressants may

have a sudden switch to mania. In such cases, antidepressants should be stopped immediately.

Patient education

- Explain the nature of illness, consequences of untreated depression, suicidal risk, need for adequate doses for adequate duration, and other supportive measures.
- The therapeutic response takes time to appear but side effects may appear earlier. Common side effects of tricyclic antidepressants are dry mouth, constipation, postural hypotension (giddiness), blurred vision, sweating, palpitation, tremors, delayed micturition, sedation, etc.
- Common side effects of fluoxetine are agitation, headache, nausea or heartburn, tremors, changes in sexual performance, blurred vision, dry mouth, loss of appetite.
- Patient should be cautioned against increasing or decreasing the dose without medical advice.
- The drug may impair mental or physical abilities initially, avoid driving or operating machinery if you feel drowsy.
- One should avoid alcohol during treatment, as it may cause oversedation and dizziness.
- Patient should be advised not to stop drug suddenly as it may result in withdrawal symptoms.

References

1. American Psychiatric Association Practice Guideline for the Treatment of Patients with Major Depression. American Journal of Psychiatry 2000, 157 (4) Suppl.
2. Mood disorders: Treatment of Depression. In: Comprehensive Textbook of Psychiatry, B.J.Sadock & VI Sadock (eds), Vol I, 7th Edition, Lipincott Williams & Wilkins, Philedelphia, pp 1377-85.

MIXED ANXIETY DEPRESSION

It is one of the commonest psychiatric disorder seen in general clinical practice presenting with anxiety and depressive symptoms.

Salient features

- Presence of both anxiety and depressive symptoms for at least one month.
- Combined symptoms of anxiety and depressive disorders but do not meet criteria for anxiety or depressive disorder.
- Symptoms of autonomic hyperactivity like palpitations, tremors, dry mouth, stomach churning etc.

Treatment

Nonpharmacological

- Psychological support, encouragement.
- Relaxation exercises, yoga, and meditation.

Pharmacological

Cap. Fluoxetine 20 mg/day, to be given in morning after breakfast. If no response after 4 weeks dose may be increased to 40 mg /day.

Or

Tab. Alprazolam 0.5-1.0 mg/day in 2-3 divided doses, if no response in 2 weeks may be increased to 2-3 mg/day.

(**CAUTION**: Alprazolam has risk of abuse potential if taken for more than 4-5 weeks)

Or

Tab. Buspirone 15 mg/day in 2-3 divided doses; if no response may be increased to 30 mg/day in 3 weeks time,

Patient may be asked to come after one week initially. Later the follow up visits can be planned fortnightly or monthly, depending on response to treatment. Treatment may be continued up to a period of 6 months. If no response in 6 weeks, the patient should be referred to a psychiatrist.

Patient education

- It is a chronic though easily treatable illness, but treatment needs to be taken regularly for a long time.
- Do not stop treatment without consulting your doctor.
- The drugs are quite safe and do not cause any harmful side effects even if taken for a long time.

References

1. Synopsis of Psychiatry, Kaplan HI, Sadock BJ (eds), 8th Edition, 1999, BI Waverly; New Delhi.

SUICIDAL PATIENT

Patients with suicidal ideation need immediate psychiatric intervention. Suicidal ideation can occur in the background of depression, schizophrenia, adjustment disorders and alcohol and other psychoactive substance abuse.

Assessment of suicidal risk

Specific questions:

- Whether the patient often feels sad?
- Whether has lost all hopes in life?
- Thoughts that it is better to be dead than to face the constant miseries of life.

- Thoughts of causing death to self.
- Suicide plans.

Risk factors for predicting the risk of suicide: suicidal attempt in past, male sex, age above 45 years in men and above 55 years in women, presence of psychiatric illness especially schizophrenia and depression, substance abuse or dependence, recent bereavement, social isolation, family history of suicide, unemployment, physical illnesses like malignancy, chronic pain, epilepsy, AIDS and recent will.

Treatment

Treatment is specifically directed at the cause, if identifiable. The patient should be referred to a psychiatrist immediately after ensuring the following steps:

- Patient should not be left alone and be kept under constant observation. Family should be explained the seriousness of the problem and actively included in management.
- Patient should be offered psychological support and reassurance and not criticized.
- No dangerous or potentially dangerous objects such as knife, blade, sharp edged objects, rope, medication supply, etc. be available in immediate vicinity of the patient.

Specific treatment for depression, psychotic disorder or whatever may be the cause should immediately be started.

Patient education

- Family should be advised to follow a supportive approach towards the patient and should not criticize.
- Suicidal attempt is indicative of distress and needs treatment of the causative illness.

References

1. Synopsis of Psychiatry, Kaplan HI, Sadock BJ (eds), 8th Edition, 1999, BI Waverly; New Delhi.

GENERALIZED ANXIETY DISORDER

It is one of the common psychiatric disorder in general clinical practice, which is seen more commonly in women than in men. Patients often present in general clinical practice with symptoms of sympathetic overactivity, vague aches or pains.

Salient features

- Persistent anxiety, present all the time.
- Tremulousness, shakiness, generalized aches, restlessness.
- Apprehension, worries of future, irritability, sleeplessness.
- Palpitations, sweating, dry mouth, increased frequency, abdominal distress.

Intensity, duration and frequency of the anxiety and worry is far out of proportion to the actual likelihood or the impact of the feared event and it interferes in the task in hand.

Treatment

Nonpharmacological

- Counselling, reassurance, psychological support, encouragement.
- Relaxation exercises, meditation, yoga.

Pharmacological

Tab. Diazepam 5-20 mg/day or Tab. Lorazepam 1-4 mg/day or Tab. Alprazolam 0.75-1.5 mg/day in 2-3 divided doses.

Treatment should be started at the lowest dose, which can be increased up to the maximum dose to achieve a therapeutic response, but attempt should be to keep it at the minimal possible level. Because of the abuse potential, benzodiazepines should not be given for more than 4-6 weeks and should be tapered off in the next 1-2 weeks.

Or

Tab. Buspirone 30-60 mg/day in 2-3 divided doses.

It is effective in 60 to 80% of patients especially in reducing the cognitive symptoms. It takes two to three weeks to show its effect.

Or

Tab. Propranolol 40-80 mg/day in 2 divided doses, given especially if the predominant symptoms are those of sympathetic overactivity.

(**CAUTION: To** be avoided in patients with history of chronic obstructive airway disease and bronchial asthma).

Buspirone may be combined with benzodiazepines initially as it shows its effect after two to three weeks after which benzodiazepines may be gradually withdrawn.

Patient education

- Patient should be encouraged to bring out life style changes like mild exercise such as morning walk, keeping some time for leisure or entertainment.
- Patients should be informed about the abuse potential of the drug.

References

1. Anxiety Disorders: Somatic Treatment. In: Comprehensive Textbook of Psychiatry B.J.Sadock & VI Sadock (eds), Vol.1, 7th Edition, 2000, Lipincott Williams & Wilkins: Philedelphia, pp 1490-98.

PANIC DISORDER

Panic disorder is a common psychiatric disorder, presenting often in primary care or general medical emergency settings. The patients are likely to be misdiagnosed as having acute cardiorespiratory problem.

Salient features

- Discrete episodes of sudden onset of palpitations, chest pain, choking sensations, dizziness, feelings of unreality; often accompanied by fear of dying, losing control.
- Individual attacks last for minutes.
- Not associated with situational trigger and occurs out of the blue.
- Onset and remission of individual attacks spontaneous.
- Often lead to persistent fear of going alone or the situation of attack.
- Diagnosis made when several attacks have occurred in previous month.

Treatment

Nonpharmacological

- Reassurance, encouragement, psychological support.
- Muscular relaxation exercises, meditation, yoga.
- Cognitive behaviour therapy (to be given by a psychiatrist).

Pharmacological

Cap Fluoxetine 20-40 mg/day; starting dose 20 mg/day which can be increased to 40 mg/day after 5-6 weeks in case of non response; always to be given in morning after breakfast.

Or/And

Tab. Alprazolam 1.5-6.0 mg/day in 2-3 divided doses Or Tab. Clonazepam 1-4 mg/day in two divided doses. Treatment started at dose of 0.5 – 0.75 mg/ day and increased every 2-3 days to the minimal effective therapeutic dose.

Or

Tab. Imipramine 50 mg/day in 2 divided doses, increased slowly by 25

mg every two to three days to a maximum dose of 150-250 mg/day. Response may take 2-3 weeks to begin and 8 -12 weeks to stabilize. Treatment needs to be given for a minimal period of 8-12 months. Medicines should be tapered off thereafter slowly over a period of 6-8 weeks. If the patient does not show any response in 6 weeks, refer to a psychiatrist.

Patient education

- General reassurance about benign nature of symptoms and spontaneous recovery of individual attacks.
- Breathing exercises.

References

1. Anxiety Disorders: Somatic Treatment. In: Comprehensive Textbook of Psychiatry B.J.Sadock & VI Sadock (eds), Vol I, 7th Edition, 2000 , Lipincott Williams & Wilkins: Philedelphia, pp 1490-98.
2. American Psychiatric Association Practice Guideline for the Treatment of Patients with Panic Disorder. American Journal of Psychiatry 1998, 155 (5) Suppl.

SOCIAL PHOBIA OR SOCIAL ANXIETY DISORDER

Social phobia is a common psychiatric disorder which often remains unrecognized and may be just taken as manifestation of shyness. The illness tends to be chronic.

Clinical Features

- Strong and persistent fear of social or performance situations in which embarrassment or humiliation may occur and avoidance of such situations.
- Fear considered irrational by the individual.
- Anticipatory anxiety before such exposure.
- Exposure leads to panic attack.

Treatment

Nonpharmacological

- Reassurance, encouragement, psychological support.
- Muscular relaxation exercises, meditation, yoga.
- Cognitive behaviour therapy (To be given by a psychiatrist).
- Social skill training (To be given by a psychiatrist).

Pharmacological

Benzodiazepines: like Tab. Alprazolam 1.5-6.0 mg/day in 2-3 divided

doses or Tab. Clonazepam 1-4 mg/day in 2 divided doses. Treatment started at dose of 0.5–0.75 mg/day and increased every 2-3 days to the minimal effective therapeutic dose.

Or

Cap Fluoxetine 20-40 mg/day; starting dose 20 mg/day which can be increased to 40 mg/day after 5-6 weeks in case of non response; always to be given in morning after breakfast.

Or

Tab. Propranolol 10-20 mg 1 hour before the performance.

Treatment needs to be continued for about one year. If no response in 8 weeks, patient should be referred to a psychiatrist.

Patient education

- Don't avoid the anxiety provoking situations. Try to face them.
- Take your medicines regularly as advised. Medicine helps in controlling the anxiety and building up the confidence.
- The symptoms can be treated effectively.

References

1. Anxiety Disorders: Somatic Treatment. In: Comprehensive Textbook of Psychiatry B.J.Sadock & VI Sadock (eds), Vol I, 7th Edition, 2000, Lipincott Williams & Wilkins: Philedelphia, pp 1490-98.

OBSESSIVE COMPULSIVE DISORDER

Obsessive compulsive disorder is characterized by obsessions and compulsions and often tends to be chronic.

Clinical features

- Recurrent obsessional thoughts may present themselves in form of repetitive ideas, images or impulses.
- Perceived as senseless by the sufferer, who feels distressed and tries to resist them unsuccessfully.
- Compulsive acts are repetitive behaviour which are not enjoyable and do not result in the completion of inherently useful tasks.
- Cause marked anxiety and distress in the individual.
- Significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationship.

- Illness usually begins in adolescent or early adult life and majority of patients have a chronic waxing and waning course.

Treatment

Nonpharmacological

Counselling, psychotherapy and behaviour therapy to be given by a psychiatrist.

Pharmacological

Tab. Clomipramine 75-150 mg/day in single or divided dose; started with small doses, 25 mg twice a day, and is increased by 25 mg/day every third day till 150 mg/day. To be avoided in patients with epilepsy, heart diseases, glaucoma, and benign prostate hypertrophy.

Or

Tab. Fluoxetine 20-40 mg/day in 2 divided doses; starting dose 20 mg/day which can be increased gradually in increments of 20 mg after 4-5 weeks in case of non response up to 60 mg, given in morning after breakfast.

Anxiety and distress are the first to respond. Gradually with continuation of treatment, the obsessive and compulsive symptoms also decrease and disappear. If no response is seen within 6-8 weeks, the patient should be referred to a psychiatrist.

Patient education

- Reassure the patient that though the disease being distressing and disabling, it is a treatable condition.
- The drug takes about 2 weeks for its therapeutic response to manifest.
- Side effects may appear before the onset of therapeutic response. Common side effects of Clomipramine are dry mouth, constipation, postural hypotension (giddiness), blurred vision, and sedation. Side effects of fluoxetine include gastrointestinal distress, nausea, headache, nervousness, anorexia, restlessness and sexual side effects. Patient usually adapts to these side effects with time.
- Advise the patient that treatment may continue for a long time. He/she should not leave drugs without medical advice.
- In case of any untoward effects of drugs, he/she must immediately get in touch with his clinician.
- Patient must continue all his regular activities as far as possible.
- Yoga, meditation, physical exercises are useful measures along with drug therapy.

References

1. Anxiety Disorders: Somatic Treatment. In: Comprehensive Textbook of Psychiatry B.J.Sadock & VI Sadock (eds), Vol. 1, 7th Edition, 2000, Lipincott Williams & Wilkins: Philedelphia, pp 1490-98.
2. A Review of Efficacy of Selective Serotonin Reuptake Inhibitors in 2000 Obsessive-Compulsive Disorder,1999, Journal of Clinical Psychiatry, pp 60, 101-105.

INSOMNIA

Insomnia is one of the commonest complaints in psychiatric, medical and general clinical practice. Common causes include a recent stress, psychiatric illnesses like depression and anxiety disorders, pain in any body part or substance abuse.

Salient features

- Difficulty in initiating sleep, frequent awakenings from sleep, early morning insomnia or non-restorative sleep. In the elderly, the physiological reduction in number of hours of sleep does not amount to insomnia. If the patient is distressed by decreased sleep, treatment may be given to increase the duration of sleep.
- Stressful situation leading to insomnia or the symptoms of the causative illness can be elicited on careful enquiry.
  Duration of symptoms may vary from few days to many months or years depending on the cause.

Treatment

- Treat the underlying cause. In both primary insomnia (where no cause is identifiable) and insomnia due to other causes management includes introducing good sleep hygiene and medications for short period if required

Sleep Hygiene

- Keep a regular time for going to bed and arising up. Avoid day time naps.
- Limit daily in-bed time to the usual amount present before the sleep disturbance.
- Avoid large meals near bedtime; eat at regular times daily. No stimulant medication or food beverages (caffeine, nicotine, alcohol, etc.) especially in the evenings.
- Mild to moderate physical exercise in the morning.
- Avoid evening stimulation: substitute radio or relaxed reading for television.
- Practice evening relaxation routines, such as progressive muscular

relaxation or meditation.
- Maintain comfortable sleeping conditions.

Pharmacological

Tab. Diazepam 5-10 mg or Tab. Nitrazepam 5-10 mg HS.

Or

Tab. Zopiclone 7.5-15 mg HS.

Or

Tab. Zolpidem 5-10 mg HS.

Precautions

- Medication to be given ½-1 hour before the usual time of going to bed.
- Medications should be prescribed at the lower dose for a period of 5-7 days.
- Benzodiazepines like diazepam and nitrazepam have risk of abuse potential if taken for more than 4-5 weeks.

Patient education

- Stress on basic principles of sleep hygiene as above.
- Zopiclone sometimes causes metallic taste.
- Patient to avoid exceeding the prescribed dose and should not take medicines beyond the prescribed period.
- Sometimes these drugs can lead to sedation during daytime. In such case reduce the dose to half and contact the doctor.
- Diazepam and nitrazepam carry risk of dependence.

References

1. Synopsis of Psychiatry, 8th Edition, 1999, BI Waverly; New Delhi.

ATTENTION DEFICIT /HYPERACTIVITY DISORDER

Attention deficit hyperactivity disorder is one of the commonest psychiatric disorders in children, seen more often in boys.

Salient features

- Persistent pattern of hyperactivity or inattention (more frequent and severe than typical of children at a similar level of development).
- Onset usually before 7 years of age.
- Difficulty in sustaining attention in tasks or play activities.
- Distracted easily by extraneous stimuli.
- Irritability, temper tantrums, impulsivity, does not wait for his turn.

Treatment (to be treated by a psychiatrist).

Pharmacological

- Tab. Methylphenidate 2.5-5 mg twice a day after meals at 8 AM and 12 noon; may be increased up to 10-15 mg/day (0.6-2.1 mg/kg/day), though maximum dose can be up to 60 mg/day, to be given under strict psychiatric supervision.

Parent education

- Counselling; learning to anticipate the situations that allow behavioural problems to appear and plan ahead so as to minimize disruption.
- Encouraging parents to screen the peer relationships of the child so as to protect the vulnerable child.
- Recognizing the attention difficulties of the child and tailoring the work expectations by reducing the length and complexity of assignments.
- A coordinated effort both at home and school.
- Side effects include anorexia, headache, insomnia, weight loss, tachycardia, and growth suppression.

References

1. Synopsis of Psychiatry, 8th Edition, 1999, BI Waverly; New Delhi.
2. Attention Deficit Hyperactivity Disorder. In: Textbook of Postgraduate Psychiatry, JN Vyas & N Ahuja (eds), 2nd Edition, 1999, Jaypee Brothers: New Delhi.

ALCOHOL DEPENDENCE SYNDROME

Salient features

- Compulsion to drink, difficulties in controlling alcohol consumption, tolerance, progressive neglect of alternative pleasures or interests, persisting with drinking despite clean evidence of overtly harmful consequences and withdrawal state (tremor, tachycardia, anxiety, sleep disturbance, nausea, vomiting, hallucination, generalised seizure and delirium in severe cases).

Treatment

Detoxification (treatment of the withdrawal state and associated problems). This can be done in an outpatient or in-patient settings.

Outpatient treatment is preferred when the withdrawal state is uncomplicated

1. Inj. Thiamine 100 mg IM.

   Or

   Tab. Thiamine PO along with oral multivitamins and folate 1 mg.
2. Tab. Chlordiazepoxide 25 mg 3 times a day.

   Or

   Tab. Diazepam 5 mg 3 times a day.

   Once the patient is well sedated and stable, the dosage should be decreased 20% per day over a maximum period of two weeks. The patient should be monitored over this period for the appearance of the signs of delirium.

Inpatient treatment is advised when withdrawal state is associated with seizures, delerium or emesis, fluid and electrolyte disturbance, medical condition like pneumonia or surgical problem (e.g. head trauma), hallucinatory behaviour, suicidality and previous history of delerium tremors.

1. Inj. Thiamine 100 mg IV/IM for a period of a week.
2. Tab. Multivitamin along with folate also should be continued.
3. For young patients without any significant liver disease. Chlordiazepoxide 25 mg or Diazepam 10 mg (long acting benzodiazepines 3 times a day).

   For elderly patients or in presence of significant liver disease.

   Tab. Oxazepam 15 mg or Tab. Lorazepam 2 mg every 2 hour should be started.

   After the first day, long acting benzodiazepines may be given in four daily doses.

   The vital signs and withdrawal symptoms should be monitored 2-4 hourly. Once the patient is stable, the dose should be gradually tapered off (20% per day) over a period of 10 to 14 days.
4. Fluid and electrolyte disturbance should be corrected especially if there is vomiting or fever.
5. Seizures - Rum fits (appearing within 24 hours of abstinence) can be treated with Inj. Diazepam 10 mg or Inj. Lorazepam 2 mg IV stat especially when seizures are repeated. Prophylactic treatment is not recommended for true alcohol withdrawal fits.
6. Delirium tremens - The patient should be preferably treated in an intensive care unit.

   a) An intravenous line should be started immediately and Thiamine 100 mg IV should be administered. Thiamine along with multivitamin should be continued parenterally till normal diet is resumed.

   b) IV dextrose and saline should be given at a rate adequate to replace fluid losses and maintain blood pressure.

   c) Hyperthermia should be managed with cold sponge. Tab. Paracetamol 500 mg PO 4 times a day may be used in absence of

any hepatic dysfunction.

d) Diazepam 10 mg should be given slowly IV and should be repeated every 15-20 minutes till sedation is achieved.
e) Physical restraint may be necessary if the patient is combative.
f) Associated medical and surgical problems should be simultaneously investigated and treated appropriately.

Long term treatment (to be treated by a psychiatrist)

The goal of this treatment is to help the patient maintain long term abstinence.

Nonpharmacological

Individual counselling and family support should be planned along with pharmacotherapy. After remission the patient should be encouraged to join self help groups like Alcoholic Anonymous (AA).

Pharmacological (Preferably treated in in-patient setting)

Tab. Disulfiram 250-500 mg a day may be used if the patient desires enforced sobriety and who have remained alcohol free for at least 7-10 days. Patients taking disulfiram develop an extremely unpleasant reaction on intake of even small amounts (e.g. 7 ml) of alcohol. The reaction occurs due to accumulation of acetaldehyde and includes flushing, headache, throbbing in head, dyspnoea, hyperventilation, tachycardia, hypotension, sweating and confusion.

In the event of disulfiram-ethanol reaction (DER). The diphenhydramine 50 mg IV is symptomatically helpful. Hypotension should be treated with IV saline. Vasopressors are required in case of shock. Respiratory distress improves with administration of oxygen. Hypokalaemia has been reported and should be corrected. Disulfiram should be continued for several months to establish a long term pattern of sobriety.

Or

Tab. Naltrexone 50 mg PO once daily.

Patient education

- Patient should be told about nature of illness, course and treatment modalities available through individual sessions.

References

1. Manual of Psychiatric Emergencies, 2nd Edition, 1998, Little Brown & Co. Boston, pp 245-254.
2.. Pocket Handbook of Clinical Psychiatry, 2nd Edition, B.I. Waverly Pvt. Ltd, New Delhi 1996, pp 66-73.
3. American Psychiatric Association, Practice Guidelines for the Treatment of Psychiatric Disorders. Compendium 2000, American Psychiatric Association, Washington DC, 2000, pp 182-194.

OPIATE DEPENDENCE SYNDROME

Salient features

- Compulsive need to take the drug, tolerance, progressive neglect of alternative pleasures or interests, persisting with drinking despite clear evidence of overtly harmful consequences and a withdrawal state (aches and pains, lacrimation, rhinorrhoea, yawning, tachycardia, piloerection, vomiting, loose motions, sleep disturbance and spontaneous ejaculation).

Treatment of opiate withdrawal state (to be treated by a psychiatrist)

1. Tab. Clonidine 10-20 mcg/kg/day in 3 divided doses. The dose is the adjusted to reduce withdrawal symptoms as much as possible without causing hypotension. The drug is usually withheld if a patient's blood pressure drops below 90/60 mmHg. After stabilization on clonidine for 4-5 days (for short acting opioids like pethidine, morphine or heroin), the drug is tapered over 4-6 days. Clonidine assisted withdrawal is better carried out in inpatient settings where monitoring of the side effects like hypotension is possible. Some patients obtain very little symptomatic relief from clonidine as certain withdrawal features like pain and insomnia are not well controlled by the drug.

   Or

   Tab. Buprenorphine 0.6 to 1.2 mg/day PO divided in 3-4 doses. The dose is slowly built up to a maximum of 2-3 mg/day around 3 to 5 days of abstinence when the withdrawal from short acting opiates like heroin is likely to be at the peak. Once the patient is stable for 3-4 days, the drug is tapered off 20% per day. Tapering and stopping the drug is crucial as some patients, when not monitored properly and not helped by other modalities (psychosocial methods) of treatment, continue to take the drug indefinitely.
2. Hypnotics (e.g. Zolpidem, long acting benzodiazepines), NSAIDs, antidiarrhoeals, antiemetics are also used for a few days during acute withdrawal of opiates.
3. Dehydration and poor hygienic states need appropriate medical care.
4. Associated physical and mental disorders have to be managed simultaneously.

Long term treatment

Nonpharmacological

- Individual counselling, family support and encouraging the patient to

join the self help groups are also important to help him maintain longterm abstinence. However opiate dependence is a highly relapsing disorder, and prolonged inpatient stay in settings that also provide rehabilitative inputs is usually beneficial.

Pharmacological

1. Tab. Naltrexone 50 mg/day PO is used to reduce craving and thereby to help patient maintain longterm abstinence (who have remained opioid free for at least 7-10 days. Baseline hepatic functions should be assessed, and to be monitored once a month while on naltrexone treatment. The drug is usually continued for a period of 6 months, however, it may have to be withdrawn in presence of significant liver disease (i.e. several fold increase in the serum levels of transaminases).

Patient education

- Patient should be told about nature of illness, course and treatment modalities available through individual sessions.

References

1. Manual of Psychiatric Emergencies. 2nd Edition, 1998 Little Brown & Co. Boston, pp 233-244.
2. Pocket Handbook of Clinical Psychiatry. 2nd Edition, 1996, B.I. Waverly Pvt. Ltd, New Delhi, pp 51-59.
3. American Psychiatric Association, Practice Guidelines for the Treatment of Psychiatric Disorders. Compendium 2000, American Psychiatric Association, Washington DC, 2000, pp 200-210.

Management of wandering mentally ill patient or a mentally ill patient with no family member or attendant

Mental Health Act, 1987 has provision for hospitalization of the mentally ill patients in mental hospitals. If one happens to come across a psychiatric patient wandering aimlessly or indulging in socially disorganized behaviour in a public place, one can approach the local police station. The incharge of the local police station under whose jurisdiction the place lies, has a duty under the Act to take the patient to the concerned Metropolitan Magistrate in Delhi (in metropolitan cities) or the Sub-Divisional Judicial Magistrate or Chief Judicial Magistrate or any Magistrate of first class (in other cities). The Magistrate can issue a reception order for admission of the patient to a mental hospital after getting him examined by a medical officer. Admission to mental hospital can also be made on the request of the patient, if the patient is willing to consent (voluntary admission) or on the request of family members, if they so desire (admission under special circumstances).

Immediate medical management is as of an excited psychotic patient as given under schizophrenia (see section on schizophrenia).

17
ORTHOPEADIC CONDITIONS

OSTEOARTHRITIS (OA) KNEE

Osteoarthritis of the knee is an end result of the degeneration of the articular cartilage.

Salient features

- Pain, stiffness after rest, difficulty in climbing stairs, difficulty in getting up from squatting position, grating sensations and off & on episodes of flare and swelling. Erythema and palpable warmth are possible but rare. Genu varum deformity and/or fixed flexion contracture in severe cases.
- Classical radiological triad-joint space narrowing, peripheral osteophyte formation and subchondral sclerosis.

Treatment

Nonpharmacological

Supportive adjunctive therapy is essential to improve functional adaptation and to diminish pain:

- Weight reduction (if overweight); ice fomentation for acutely swollen knee, however, hot fomentation may give symptomatic relief to some chronic patients.
- Supervised non-traumatic muscle conditioning and rehabilitation regimens e.g. Isometric quadriceps strengthening exercise (all vigorous exercises to be avoided in acutely swollen/painful knee).
- Compressive bandage or crepe bandage for effusion.
- Assistive devices like cane (to be held in the hand contralateral to more painful side), walker for patients with severe deformities or unsteady gait.

Pharmacological

1. Topical applications- containing salicylates, capsaicin, nicotinates, menthol, camphor, NSAIDs in various combinations may provide symptomatic relief.
   (**CAUTION**: Avoid hot fomentation immediately after topical applications).

2. Non-steroidal antiinflammatory drugs (NSAIDs) for pharmacological pain palliation. The choice of NSAID depends upon dosing convenience, physician and patients comfort, price and the past experience on its frequency and severity of side effects as all are equipotent in full therapeutic dose. (Avoid intraarticular or oral steroids).

Table 1. *Commonly used NSAIDs for OA Knee*

A. Acute painful situation/moderate pain (for initial 7-14 days), preferably take NSAIDs after meals.

- Tab. Paracetamol 500 mg 4-6 hourly (maximum daily dose 4000 mg).

  Or

- Tab. Ibuprofen 400 -600 mg 2 or 3 times a day (maximum daily dose 3200 mg).

  Or

- Tab. Diclofenac sodium 50 mg 3 times a day or 75 mg 2 times a day (maximum daily dose 200 mg).

  Or

- Tab. Nimesulide 100 mg 2 times a day (maximum daily dose 400 mg).

  Or

- Tab. Aspirin 350 mg 2 tablets 4-6 hourly (maximum daily dose 5000 mg).

B. For mild to moderate pain/chronic pain control (for 3-6 weeks and then SOS).

- All above medicines in reduced frequency of dosages.

  Or

- Alternative forms -Tab. Diclofenac sodium 100 mg/75 mg sustained release once a day.

  Or

- Tab. Piroxicam 20 mg once a day.

  Or

- Tab. Nimesulide 100 mg 2 times a day.

All patients do not uniformly respond to a particular NSAID. It is not unusual for several different NSAIDs to be tried before a suitably effective and well-tolerated agent is identified for a particular patient.
(**CAUTION:** The NSAIDs may cause dose related gastric irritation, nausea, vomiting and dyspepsia, GI ulceration, perforation and haemorrhage, however, one third remain asymptomatic. NSAIDs can interfere with antihypertensive therapy due to salt and water retention).

3. In case of epigastric burning or nausea or vomiting either discontinue and switch over to safer NSAID or administer Cap. Omeprazole 20 mg half an hour before breakfast and half an hour before dinner.

In patients on prolonged therapy with NSAIDs monitor haemoglobin, stool for occult blood as these drugs may also cause leukopenia, thrombocytopenia and agranulocytosis.

Refer the patient to an orthopaedic surgeon in case of persistent swelling, presence of constitutional symptoms or mechanical symptoms like locking or frequent giving away sensations. Surgical intervention may be required for severe deformities, contractures, and advanced disease with intractable pain, severe enough to affect independent performance of activities of daily living, for prolonged periods.

Patient education

- There is no curative pharmacological agent for osteoarthritis knee and the disease is irreversible.
- Nonpharmacological treatment has a major role to play in treatment.
- Take minimal possible medication that provide symptomatic relief and to wait for 1-2 weeks, for drug to show its effect.
- Topical applications do not penetrate into the joint through skin directly.
- Intra-articular steroid Injections give only temporary relief and risks of repeated intra-articular injections far outweigh its advantages.
- To avoid those activities which exacerbate pain like sitting cross legged or squatting on floor.
- To use ramp instead of stairs wherever feasible.
- Not to do vigorous exercises with acutely inflammed knee.
- To report back if recurrent effusions in knee or systemic symptoms. Former may be caused by mechanical disorder along with OA knee like loose body or meniscal tear. Later situation could be caused by diseases of knee other than OA.

References

1. Acetabular Bone Destruction Related to Non Steroidal Antiinflammatory Drugs. Lancet 1985, pp 2: 11-4.
2. Osteoarthritis. In: Harrison's Principles of Internal Medicine, Vol 2, 14th Edition, 1998, McGraw Hill Company Inc., International Edition.
3. Osteoarthritis. In: Conn's Current Therapy, Robert E Rakel (ed), 1999, WB Saunders Company, Philedelphia.

RHEUMATOID ARTHRITIS (RA)

Rheumatoid arthritis is characterized by persistent inflammatory synovitis (usually involving small and large peripheral joints in symmetrical fashion)

causing cartilage destruction and bone erosion leading to changes in joint integrity. The revised criterion of American College of Rheumatology (1987) aids in diagnosis and classification.

Treatment

Since the aetiology of RA is unknown, therapy remains empirical and palliative, aimed at relieving the signs and symptoms of the disease.

Nonpharmacological

In acute pain rest and splint. Otherwise exercises directed at maintaining muscle strength and joint mobility without exacerbating joint inflammation. A variety of orthotic (splints) and assistive devices (cane, walker) can be helpful in supporting and aligning deformed joints to reduce pain and improve function.

Pharmacological

1. In acute inflammation any of the NSAIDs as given in section on osteoarthritis may be given except paracetamol. The antiinflammatory action of the NSAIDs may take 2–4 weeks to become evident. Prediction of response to a particular disease modifying antirheumatic drugs (DMARD) is not possible. It takes 4-6 weeks to show its effect. Reduced NSAID dosages have to be used in the elderly and in patients with impaired renal function. Concomitant use of more than one NSAID only increases toxicity, and has no additional benefit. Patient not responding to one NSAID may still show a good response to another.
2. Topical applications- containing salicylates, capsaicin, nicotinates, menthol, camphor, NSAIDs in various combinations may provide symptomatic relief.
3. Refer to a specialist (physician) at a higher centre. Begin DMARD early in the disease..
4. Tab Methotrexate 7.5 mg to 15 mg every week. Concomitant Folic acid 1 mg/day reduces side effects.
   (**CAUTION:** Nausea, mouth sores, liver damage, increase in incidence of chest infection, macrocytic anaemia. Regular monitoring of LFT is required. Avoid alcohol during therapy).
5. Only in patients with severe disease, affecting activities of daily living and not responding to adequate trial of NSAIDs and DMARD for sufficient duration:
   Tab. Prednisolone 40–60 mg/day for 2-4 weeks. Review periodically and possibly taper down slowly. If required for a longer duration administer at doses of 5–10 mg/day.
   Intra-articular corticosteroids: Methylprednisolone acetate, 20–80 mg be needed in selected cases with predominantly monoarticular arthritis of a large joint.

Refer the patient to a higher centre if no response to medical therapy after 4-8 weeks, severe extra-articular symptoms, deformities or contractures present, patient is crippled/or not able to carry out activities of daily living despite adequate medical treatment.

Surgical

Synovectomy in patients with predominantly monoarticular involvement, not responding to conservative therapy, might be helpful. Reconstructive surgery is indicated for disorganized joints.

Patient education

- The disease can be controlled but no curative agent is known. There can be remissions and exacerbations.
- At the onset of disease it is difficult to predict the natural history of an individual patient's illness.
- No characteristic features of patients have emerged that predict responsiveness to a particular DMARD.
- Life style modification may be required depending on the degree of disability.
- Regular mild exercises as prescribed by the doctor helps in prevention of deformity, maintain range of motion of the joints and muscle strength.
- Magic drug for rheumatic arthritis might contain steroids. Better to consult a qualified doctor before taking it.

References

1. Rheumatoid Arthritis. In: Harrison's Principles of Internal Medicine. Fauci AS, Braunwald E., Kurt J Isselbacher et al (eds), 14th Edition, 1998, McGraw Hill Company Inc., International Edition.
2. Rheumatoid Arthritis. In: Conn's Current Therapy. Robert E. Rakel (ed), 1999, WB Saunders Company, Philedelphia.

CERVICAL AND LUMBAR SPONDYLOSIS

Spondylosis is a clinical syndrome resulting from degeneration of intervertebral discs and facet joints.

Salient features

- Pain and stiffness with decreased range of movement of gradual onset. Occasional acute flare ups of pain with muscle spasm. Neck pain may radiate to occiput, scapular area and down to one or both arms (may be associated with paraesthesias). Back pain is usually diffuse and may radiate up to knees through back of thighs.

- Radiologically narrowing of one or more intervertebral spaces, spur formation (osteophytes) and subchondral sclerosis are the hallmark.

Treatment

Nonpharmacological

- In acute painful situation rest, moist heat in cold weather and light massage (improves tone, circulation & elasticity) to paraspinal muscles. Cervical traction in the position of maximum comfort to neck (5-10 pounds) for 10-15 minutes. Ultrasonic exposure on painful trigger points in cervical & shoulder muscles. Removable soft cervical collar/ back corset/ back belt for symptomatic relief.
  (No exercises in acute painful situation).
- In chronic pain mobilization and strengthening exercises, moist heat and cervical traction.

Pharmacological

Same as described for osteoarthritis of knee.

Patient education

- In cervical spondylosis avoid prolonged desk work, if must, then intermittent rest is required and proper writing, typing, sitting posture (avoid low table, use tilt table) and care of the neck.
- In lumbar spondylosis explain the patient how to manage weight since extra weight puts greater stress on the back muscles and to maintain proper body alignment while standing with feet slightly apart. When standing for long periods, use a small stool to keep one foot up with knee bent.
- Do not tense up or concentrate on standing up straight, just stand naturally.
- Try to avoid carrying heavy bags on shoulders.
- Care of back while sitting by using well designed fully adjustable chair to provide plenty of support to the lower back. If chair is uncomfortable use a rolled up towel or small pillow to support the back. When sitting for long periods rest your feet on low stool and use arm rests to support weight of your body. Try not to sit in the same position for long periods. If prolonged sitting is must take rest for a minute or two every hour.
- To lift weight cautiously by keeping the back as much upright (vertical) and straight (not hunched over) as one can. Not to bend over at waist to pick up the object instead squat, get under or next to object not on top of it. Lift with your leg muscles rather than back or abdominal

muscles. Hold the object close to your body while lifting and carrying and do not twist your body.

- To sleep safely on a firm bed. While sleeping supine legs should be supported with pillows. Not to sleep on your stomach. Sleeping on your side with knees bent and hips tilted forward is probably the best.

Refer to a higher centre in case of severe pain that disturbs sleep/not responding to conservative treatment for more than 2 weeks/associated with severe restriction of neck or back movements or torticollis or sciatic pain or constitutional symptoms/neurological symptoms with back or neck pain.

SPRAINS

An injury to a ligament(s), by sudden unnatural or excessive movement of a joint, is termed as a sprain. Symptoms are pain, swelling, discoloration of the skin, especially bruising and impaired joint function.

Salient features

- Mild or grade I sprains- partial tearing of ligament fibres, minimal swelling and no joint instability.
- Moderate or grade II sprains - pain, oedema, ecchymosis, joint tenderness with some loss of joint motion but no joint instability.
- Severe or grade III sprains- gross instability of the joint with complete tearing of all fibers, marked swelling and severe pain.

Treatment

Nonpharmacological

Check the sensation and circulation distal to the injury. Obtain X-rays of the involved region to rule out a fracture. Stress X-rays may show abnormal opening of the joint in a grade III sprain.

Protection, support and rest.

- Restrict the movement of the affected area.
- Apply cold compresses immediately (this will help to reduce swelling). Avoid using ice directly on the skin.
- Elevation of the limb above the level of the heart- especially at night while sleeping.
- In a grade I sprain, apply a compression bandage for a period of 5-7 days, patient may be allowed to bear weight after a week.
- In a grade II sprain, splintage (slab later on converted to cast) may be used to restrict joint motion, but the patient has to remain non-weight bearing for 4-6 weeks.

Pharmacological

1. Tab. Ibuprofen 400 mg 3 times a day for 5-7 days.
   Or
   Tab. Diclofenac sodium 50 mg 3 times a day for 5-7 days.
   Or
   Tab. Nimesulide 100 mg 2 times a day for 5-7 days.

Refer the patient to an Orthopaedic Surgeon if a fracture is suspected or if there has been a serious injury (grade III sprain with instability) or persistent pain (delayed recovery of grade I or II sprain), there is an audible popping sound and immediate difficulty in using the joint and distal neurovascular status is doubtful.

Patient education

- Don't massage the area or do hot fomentation in acute stage. It will increase the swelling
- To give rest to the injured area until the pain subsides (usually 7 to 10 days for mild sprains and 3 to 5 weeks for severe sprains.
- Avoid activities that cause pain or swelling.
- Practice moderation in physical activities.
- If the pain and swelling decreases within 48 hours after a sprain, move the affected joint in all directions.
- To avoid high heeled shoes (for ankle sprains).

References

1. Apley's System of Orthopedics and Fractures, 6th edition,1982, Butterworths and Co. London.

ACUTE PYOGENIC OSTEOMYELITIS

Acute osteomyelitis is acute infection of the bone, commonly seen in children less than 10 years of age.

Salient features

- Diagnosis considered if any of the following two criterion are present: classic symptom of localized pain, fever (with or without chills and rigors), swelling in the metaphyseal area, warmth, and limited range of motion of the adjacent joint pus aspirated from the bone; positive bone or blood culture for pyogenic organism; radiographic changes typical of acute osteomyelitis (soft tissue swelling, periosteal reaction, lytic areas in the metaphysis).

- The X-ray changes usually appear 7-10 days after the onset of illness.

Treatment

Nonpharmacological

Rest, splintage to the part, elevation of the limb, sponging for fever.
If aspiration is positive for pus drain the pus (must be performed by an orthopaedic surgeon).
Postoperative duration of splintage depends upon extent of damage to the bone. Usual duration is 4-6 weeks. Gradually mobilize the limb and permit gradual weight bearing thereafter. Extensive destruction of bone might require support for a few months.

Pharmacological

Broad spectrum intravenous antibiotics are started depending upon most likely organism present. Commonest bacterial pathogen is *Staphylococcus aureus* (40-80% of cases). The antibiotic later on may be changed depending upon culture report or response to therapy. Intravenous administration of antibiotics is continued till favorable clinical response is achieved, followed by oral antibiotics. Total duration of antibiotic(s) administration ranges from 4-6 weeks.

1. Inj. Cloxacillin 50-100 mg/kg/day in four divided doses for 1-2 weeks
2. Inj. Gentamicin 5-7.5 mg/kg/day in 2 divided doses for 1-2 weeks Or Inj. Amikacin 15 mg/kg/day in 2-3 divided doses if resistant *Pseudomonas aeruginosa.*

Or

1. Inj. Ceftriaxone 100 mg/kg/day in 2 divided doses for 1-2 weeks(maximum dose 2 g/day).

Or

Inj. Cefotaxime 100-200 mg/kg/day by I V infusion or IM or IV in 2-4 divided doses for 1-2 weeks.

Or

If patient is hypersensitive to penicillins and cephalosporins,
Inj. Clindamycin 40 mg/kg/day in 4 divided doses for 1-2 weeks.

Or

If Methicillin resistant *Staph. aureus* suspected ,
Inj. Vancomycin by IV infusion 500 mg over atleast 60 minutes every 6 hours or 1g over at least 100 minutes every 12 hours; Neonates upto 1 week 15 mg/kg initially then 10 mg/kg every 12 hours; Infant 1-4 weeks 15 mg/kg initially then 10 mg/kg every 8 hours; child over 1 month 10 mg/kg every 6 hours.

3. Oral/Inj. Paracetamol for fever (see section on fever).

Monitor therapy by clinical response. Favourable response characterized by decrease in swelling and fever, improvement in general well being and movements of limb, fall in ESR and C-Reactive protein (better indicator than ESR because closely follows the clinical response). After 7-10 days of symptoms, repeat the X-ray to assess the extent of destruction and damage to bone. Oral therapy usually started 1-2 weeks of IV antibiotic therapy, if response is favorable. The choice of oral antibiotic largely depends on culture and sensitivity report. In the absence of culture report give oral:

Syp./Cap. Cloxacillin 50-100 mg/kg/day in 4 divided doses for 3-4 weeks. (Monitor compliance as it has bitter taste).

Or

Syp./Cap. Cephalexin 25-50 mg/kg/day in 4 divided doses for 3-4 weeks.

Or

Inj. Clindamycin 25-40 mg/kg/day in 4 divided doses for 3-4 weeks.

Refer the patient to an orthopaedic surgeon if aspiration yields pus from bone or acute osteomyelitis suspected in an adult/diabetic/haemodialysis patient/IV drug user/patient with orthopaedic implant/immuno-compromised host.

Patient education

- Duration of antibiotics therapy may be required for a few weeks depending upon the response.
- Plaster (or any other splintage) might be required for prolonged periods.
- Not to make the child walk (in case of lower limb bone involvement) unless permitted.

References

1. A Comparative Study of Osteomyelitis and Purulent Arthritis with Special Reference to Aetiology and Recovery Infection, 1984, pp 12: 75.
2. Osteomyelitis and Septic Arthritis. In: Nelson's Textbook of Paediatrics, Waldo E. Nelson, Richard E. Berhman, Robert M. Kliegman et al (eds), 15th Edition, 1996, W.B. Saunder Company, (Printed in India-Prism Books Pvt. Ltd., Bangalore).
3. Bone and Joint Sepsis. In: Lovell and Winter's Paediatric Orthopaedics, Morissy RT, Weinstein SL (eds), Vol. 4, 1996, Lippincott – Raven, Philadelphia.

ACUTE SEPTIC ARTHRITIS

Acute septic arthritis is inflammation of joint caused by pyogenic microorganism, usually seen in children <10 years. The key to early diagnosis and favourable outcome remains high index of suspicion since

delay in diagnosis leads to permanent damage to the joint. Hip and knee are the commonest joints to be affected.

Salient features

- Inability to move the affected joint, refusal to walk or limp, hip pain referred to knee, acute local signs of inflammation (warm and painful joint with effusion) , and clinical signs of sepsis (fever, malaise), however, more than two thirds of infant with septic arthritis are afebrile.
- Neonates present with pseudoparalysis of extremities, discomfort while changing the diaper, unhappy or out of sorts but rarely appears to be ill or moribund.
- Ultrasound examination of suspected septic hip joint greatly aids in diagnosis.

Treatment (Refer the patient immediately to an Orthopaedic Surgeon)

Nonpharmacological

- Keep the joint in position of comfort.
- Aspiration of the joint for gram staining, culture and sensitivity.
- If aspirate is purulent drainage of the joint on an emergency basis. Drain the joint even if the joint aspiration is doubtful in the presence of a strong clinical suspicion, because the risks of negative arthrotomy are far too less than not draining an infected joint having pus. The latter situation may be disastrous for the joint resulting in lifelong permanent disability to the patient.
- After drainage splint the joint with a POP slab or skin traction to relieve pain and prevent contractures till the patient is afebrile, pain free and the joint is clinically quiescent. Intermittent mobilization is permitted to preserve the range of movement of the joint.

Pharmacological

The choice of antibiotics, duration of therapy and monitoring of the therapy are same as mentioned in the section on acute pyogenic osteomyelitis.

References

1. Osteomyelitis and Septic Arthritis. In: Nelson's Textbook of Paediatrics Waldo E Nelson, Richard E Berhman, Robert M Kliegman, et al (eds), 15th Edition, 1996, WB Saunder Company (Printed in India-Prism Books Pvt. Ltd., Bangalore) 1996.
2. Bone and Joint Sepsis. In: Lovell and Winter's Paediatric Orthopaedics, Morissy RT, Weinstein SL, Vol. 4, 1996, Lippincott Raven, Philadelphia.

18
SURGERY

MEDICAL CARE OF THE SURGICAL PATIENT

Preoperative assessment of the patient

For achieving the desired optimum results in a surgical patient, apart from evaluating the nature & extent of the diseases and choice of surgery from available options, the assessment of the patient for his ability to withstand the stress of surgery & anaesthesia is very important. The factors that must be considered in preoperative assessment are

(i) The disease (and its extent) for which the surgery is planned.
(ii) The condition of the patient and his organ systems.
(iii) The relative urgency of the surgery.
(iv) The type of surgery and its alternatives.
(iv) The relative morbidity and mortality of the disease.
(vi) The relative morbidity and mortality of the surgical procedure.

All these factors are interdependent and this assessment is the most fundamental task to be preformed in a surgical patient. The best person to undertake this task is the surgeon himself. Surgeon may, at times, need the help of a physician, cardiologist or anaesthetist, to take the right decision. The preoperative assessment should also include discussion on drugs being taken by the patient & documentation of known allergies.

Informed consent

Informed consent should be taken after a detailed discussion by the surgeon (or his responsible assistant) with the patient and his close relatives, informing them about the nature of the procedure planned, benefits expected, risks involved and possible alternatives, giving full opportunity to them to ask questions and clear doubts.

Preoperative preparation

- Routine investigations Hb, TLC, DLC, CT, BT, urine routine examination, and in patients over 30 years, Chest X-ray and ECG.
- Special and specific investigations depending upon the nature of the procedure planned and the physical condition of the patient for evaluating fitness for surgery.
- Skin preparation as per policy.

- Lipstick, nail polish and other cosmetics which may mask cyanosis and interfere with pulse oximetry should be removed.
- Dentures, spectacles, contact lenses, artificial limbs, artificial eyes, hearing aid and jewellry, cash and mobile phones should be removed before shifting the patient to operation theatre.
- Withholding feeds before surgery depending upon age of the patient and nature of anaesthesia and surgery planned.
- Pre anaesthesia medication as per policy.
- Pre operative treatment.

Drug treatment e.g. prophylactic antibiotics, antihypertensives, IV fluids, anticoagulants, Vitamin K etc. where relevant.

Non drug treatment e.g., rectal washouts, vaginal douches, stomach wash etc. where relevant.

Handling of Medicolegal cases

First aid has to be provided in all cases who report in an emergency state. After stabilizing the patient, patient should be properly guided and helped in shifting to the appropriate centre.

In case that we decide to treat, we must:

- Send an information, in duplicate, to the police.
- Prepare a medico legal report.
- Preserve & seal clothes etc. preserve fluid & stain samples where indicated.
- Respond to information sought by the police.
- Arrange to take dying declaration, where indicated.
- Preserve all X-rays and patient records.
- Respond to court summons.
- In case of death, hand over the body to the police.
- In case of discharge/referral, police needs to be informed.

Care during transfer

This would depend on a number of factors like nature, patient's condition, reasons for referral, readiness of the referral centre to accept the patient and whether the transfer is an emergency or elective.

Emergency transfer

- Identify the degree of emergency.
- Resuscitative measures to be adopted in serious patients with management of shock, oxygen etc.
- Transfer in an well equipped ambulance to (see relevant section for specific care).
- Transfer to a referral centre with prior intimation and confirmation of the readiness at the referral centre.
- Doctor or paramedical staff to accompany the sick patient.

Referral slip

Should contain information on:

- Condition of the patient when first seen.
- Diagnosis and resuscitative measures taken.
- Reasons for referral.
- Where referred.
- Precautions advised during transportation.
- Any other information (e.g. any staff or equipment sent along with, any communication given to referral centre or specialist concerned).

References

1. Medical Care of the Surgical Patient. In: Preoperative Medicine, Goldmann DR, Brown FH, Guarnieri DM. (eds), 2nd Edition, 1994, McGraw Hill Company Inc; New York.

POST OPERATIVE CARE

Post operative wound infection

Wound infections are classified as:

Minor: e.g. stitch abscess, cellulitis.

Major: e.g. presence of discrete collection of pus in wound.

Superficial infections, are, limited to skin and subcutaneous tissue. Deep infections involve the areas of wound below the fascia.

- **Preoperative predisposing factors**:
  Age, obesity, malnutrition, diabetes and malignancy.
- **Operative predisposing factors:**
  Duration of surgery, type of operative wound.
  Clean - 1%, clean contaminated – 1-5%, contaminated 5-30%, dirty – more then 30%, poor surgical technique, break of sterilization.
- **Postoperative** – cross infection in wards.
  Staphylococcus aureus is the most frequently involved organism. Other less common organisms are *Enterococci, Pseudomonas, Proteus, E. Coli* and *Klebsiella.*

Salient features

- Pain is unusually severe for the magnitude of procedure and last long.
- Fever: 101 to 102° F with tachycardia is usually present.
- Local Examination: Wound is warm to touch and may be swollen and edematous. Redness of the surrounding area and cellulitis is often present.
- Wound infections are generally evident between 3rd to 6th postoperative day.

Treatment

Superficial Infections:

1. Drainage: Wounds are managed by opening up the incision to provide adequate drainage.
2. Dressing: Daily dressing with Povidone iodide 5% and a wick is placed to prevent pre mature closure of the wound.
3. Analgesics: Tab. Ibuprofen 400 mg 3 times a day till pain is there.

Deep Infections: antibiotics are given on the basis of pus culture and sensitivity in addition to drainage of wound.

Prevention

Postoperative wound infection rate can be minimized by adequate skin preparation, bowel preparation, prophylactic antibiotics, meticulous surgical technique

Postoperative pain relief

Postoperative pain is associated with all surgical procedures. This varies according to the surgical procedure. Severe pain can prolong gastrointestinal ileus, urinary retention, impair respiratory movements producing atelectasis and predisposes to deep vein thrombosis due to immobilization.

Various methods to alleviate postoperative pain are NSAIDs, opioids (intramuscular, transdermal or transmucosal), patient controlled analgesia, local infiltration of anaesthetic drugs, epidural analgesia and intrapleural analgesia. The method used depends upon the site and the magnitude of surgery done, severity of pain, whether the patient is allowed orally and facilities and expertise available. It is necessary to give analgesics by intramuscular or intravenous route in the immediate postoperative period and till the patient is able to accept orally.

Commonly used agents are:

Inj. Diclofenac sodium 75 mg 6-8 hourly.

Or

Inj. Pentazocine (30 mg/ml) 30-60 mg IM/IV repeated 3-4 hourly.

Or

Inj. Tramadol (50 mg/ml) IM/IV 4-6 hourly.

Or

Inj. Morphine (15 mg/ml) 10-15 mg, can be repeated 4-6 times.

In tertiary care centers, epidural analgesia , intravenous patient controlled analgesia, intrapleural analgesia can be used under expert care.

When patient is able to accept orally.

Tab. Paracetamol 500 mg 3-4 times a day.

Or

Tab. Ibuprofen 400-600 mg 8 hourly.

Or

Tab. Nimesulide 100 mg twice daily.

Postoperative nausea and vomiting

Postoperative nausea and vomiting lead to significant morbidity and prolonged hospitalization. It has an incidence of 20-30% after abdominal surgery. Predisposing factors are diabetes mellitus, pregnancy, dehydration, electrolyte imbalance, gastroesophageal reflux, emergency surgery, use of certain anaesthetic drugs and opioids.

Treatment

Bowel obstruction (mechanical or paralytic ileus) should be ruled out as a cause of vomiting by proper examination and investigations if it is associated with abdominal distension, fever and occur beyond 3rd postoperative day.

Nausea and vomiting are managed with bed rest, Intravenous fluids, analgesics to relieve postoperative pain, nasogastric decompression.

Pharmacological

Inj. Metoclopramide (5 mg/ml) 10 mg IM/IV 1-3 times daily or SOS.

Or

Inj. Ondansetron (2 mg/ml) 4 mg IV.

In children 0.15 mg/kg.

Or

Inj. Promethazine (25 mg/ml) 2 ml IV SOS.

Postoperative pneumonia

Pulmonary disorders remain the most frequent post operative problem and 10–15% of patients are considered to have clinically significant chest complication after surgery under general anaesthesia.

Factors predisposing to increased chest complications are smoking, obesity, chronic restrictive and obstructive lung disease, prolonged general anaesthesia and presence of nasogastric tube.

Postoperative pneumonia is caused by pathogens such as *Pseudomonas, Serratia, Klebsiella, Proteus and Streptococcus.*

Salient features

- Fever, productive cough, dyspnoea, chest pain.
- Bronchial breathing and presence of rales.
- Chest X-ray shows areas of consolidation.

Treatment

1. Antibiotics: depending upon sputum culture and sensitivity. Initial treatment can be started with aminoglycoside and antipseudomonas Cehphalosporins.

2. Inj. Ketorolac 30 mg every 6-8 hours IV or IM
   Or
   Inj. Diclofenac 75 mg IM every 6-8 hours.
3. Chest physiotherapy
4. Nebulized bronchodilators: may be used if bronchospasm is present.

References

1. Preoperative and Postoperative Management. In: Maingot's Abdominal Operation' Zinner MJ, Schwartz SI, Ellis H, 10th Edition, 1997, Prentice Hall International, pp 461-478.

WOUND CARE

Wounds can be classified as acute or chronic. Acute wounds heal uneventfully within an expected time frame e.g. burns. For the purpose of guidelines, chronic wounds can be defined as an ulcer present at least for 6 weeks.

Treatment

Acute wounds

The overall objectives in caring for wounds that are incompletely clotted are to minimize unnecessary blood loss and to avoid the formation of a haematoma.

1. Irrigate gently with copious quantities of water or normal saline. Debris and necrotic tissue should be removed without damaging healthy tissue.
2. Healing of acute wound is further facilitated by closure. Alternatively, closure can be delayed for several days to allow infection to clear.

Chronic wounds

Identify and treat the predisposing factors e.g. diabetes mellitus, peripheral arterial or venous disease, severe anaemia, protein deficiency, rheumatoid arthritis, systemic vasculitis, Cushing's syndrome and conditions requiring systemic steroid therapy.

Type of ulcer	Clinical assessment	Investigation
Arterial	Involves deep fascia or deeper structure, decreased or absent distal pulses	Doppler US(ABPI<0.8)
Venous	Involves skin, subcutaneous fat Tortuous long/short saphenous veins Perforators incompetence	Doppler US/ Venography

Tubercular	Undermined edge	Edge biopsy
Trophic •	Punched out/undermined	
Malignant	Raised/everted margin	Edge biopsy
	No evidence of granulation tissue	

Nonpharmacological

- Encourage daily or twice a day bath, to avoid walking bare foot or with slippers and patient should be encouraged to wear shoes and socks.
- Patients with leg ulcer to reduce standing or excessive walking. In leg ulcer due to chronic venous insufficiency or edema, patients should be advised to wear elastic stockings, elevation of leg and foot end of the bed while asleep along with some leg exercises to activate the calf muscle pump.

Pharmacological

Identify the microorganism and treat accordingly.

Tubercular ulcer is treated with antitubercular drug (2HRZE+7HR) for at least 9 months.

Surgical treatment

Surgical debridement in ulcers associated with necrotic tissue or slough.

Clean the wound with physiological normal saline or tap water only (antiseptics delay wound healing).

Daily dressing

Gauze adheres to the wound bed and it may remove viable tissue from the wound surface on removal, resulting in delayed wound healing.

Occlusive (moisture retentive) dressings (Hydrocolloid gel) in case of clean and shallow ulcers without any pus discharge or other features of infection. Occlusive dressings have barrier properties that enable to prolong the presence of moisture and wound fluid in the wound bed.

Calcium alginate dressing: For bleeding wounds and wounds with a cavity.

Refer patients with chronic leg ulcer to a vascular surgeons general surgeons or with some experience in peripheral vascular problems for surgical treatment.

Patient education

- To prevent ulcers in future, explain about the care of leg ulcers, wearing socks, shoes and compulsion stocking.
- Good personal hygiene (daily bath) and after the bath the healed scar area should be massaged with an emollient cream such as lanolin or some other oil to keep the scar tissue soft and supple and prevent further breakdown.
- Regular use of calf muscle activating exercises and leg elevation and to avoid prolonged period of standing or sitting with legs down.
- In case of diabetic patients, control of diabetes is necessary.

References

1. Incisions, Closures & Management of Wound. In: Maingot's Abdominal Operators. 10th Edition, 1987, Prentice Hall International, pp 395-426.

VARICOSE VEINS

Chronic venous disease of the lower limb is one of the most common conditions affecting the adults. Varicose veins the most common complaint, represent one end of the spectrum of venous disease which extends through increasing degrees of venous insufficiency and may result in leg ulceration in the most severe cases.

Basle Study Venous Classification

No venous disease.

Varicosities

i. Telangiectasia/hyphenwebs (spider veins): intradermal varicose veins that are small and rarely symtomatic.
ii. Reticular veins: subcutaneous veins that begin at the tributaries of the trunk veins.
iii. Trunk veins: varicose veins of the greater/lesser saphenous system and its named tributaries.

Chronic venous insufficiency

i. Dilated subcutaneous veins.
ii. Hyperpigmented/depigmented areas.
iii. Open/healed ulcer.

Salient features

- Varicose veins refers to any dilated, tortuous, elongated vein, regardless of size.
- Duplex ultrasonography is confirmatory and also helps in localization of perforators and at times saphenopopliteal opening which is of immense help in the performance of operation. Evaluation of the deep venous system is a must in a patient with a history or clinical examination suggestive of deep venous thrombosis (leg edema, present or past ulcer).

Treatment

Carefully examine the lower limb for sapheno-femoral reflux, varices and perforators in thigh and manifestations of venous insufficiency in calf and foot. Reassurance, the use of elastic compression stockings, injection sclerotherapy or surgical treatment.

Surgical

A recent episode of deep venous thrombosis is a contraindication for operation in the superficial venous system. However, in patients with old deep vein thrombosis (DVT), perforator or obviously varicose long or short saphenous system should be ligated or treated by sclerotherapy. The most definitive approach in the thigh perforators is flush ligation and thigh stripping, with careful attention to groin tributaries. Saphenofemoral ligation alone can be performed under local anaesthesia but the addition of stripping or operation of the sapheno popliteal system warrants spinal/ general anaesthesia.

In case of small varices and those where the main long and short saphenous veins and their major tributaries, are competent, injection sclerotherapy with STD (sodium tetradecyl sulphate) is best used in the management of large varicose veins and perforators in the calf. Treatment can be repeated when necessary.

Technique: Place 25G needle into the varices or perforators. Empty the vein and inject 0.5 ml of sclerosant i.e. STD. Compression is applied immediately with compression bandage or stocking.

Or

Ambulatory phlebectomy (avulsion of veins) prevents venous recanalization with recurrence.

Postoperative management

- Compression bandaging immediately following stripping or avulsion of veins. Replace bandages by compression stocking after 2 days.
- Limb elevation and encourage the patient to walk with compression stockings after first change of dressing 48 hours after operation.
- Postoperative pain is controlled with dextropropoxyphene or NSAIDs.

Patient education

- Certain do's are leg exercise, leg elevation, wear stockings and drinking 4-5 L of fluids in a day.
- Certain don'ts are hot bath, exposure to extreme of temperatures, pregnancy, contraceptive pills and estrogens, long journeys (flight).
- Teach the patient leg exercises-frequent movements of toes and heels, Sarvangasan or Shirshasan, and elevation of foot end of the bed about 6 inches by putting a block of wood or 2 bricks under foot end of bed. To avoid prolonged standing or dangling legs down.

References

1. Venous Disorders. In: Bailey and Love's Short Practice of Surgery, Russel RCG, Williams NS, Bulstrode CJK. Arnold (eds), 23rd Edition, 20000 London, pp 235-255.

CERVICAL LYMPHADENOPATHY

An enlarged cervical lymph node is the commonest cause of lump in the neck. Cervical lymph nodes may become enlarged as a result of inflammation or neoplastic process (Table 1). Tuberculosis is the commonest cause of cervical lymphadenopathy.

Table 1. ***Causes of lymphadenopathy and clinical features***

Condition	Causes	Clinical features
Acute inflammation	Infection of the aerodigestive tract, head and neck or other infections.	Fever, sore throat, firm, tender nodes 1-2 cm in diameter
Chronic inflammation	Tuberculosis, sarcoidosis, histiocytosis X	Swelling in the neck and fever, cough may or may not be present Variable on presentation depending on the stage of the disease: multiple matted lymph nodes/ cold abscess
Lymphomas	Hodgkins/Non Hodgkins lymphoma	Large painless rubbery lymph nodes.
Metastatic	Carcinomas of the upper aerodigestive tract, skin tumours of the head and neck: squamous cell carcinoma, basal cell carcinoma, melanoma.	Symptoms related to primary disease, firm to hard lymph node enlargement

Treatment

Detailed history and examination are essential to pinpoint specific aetiology. Majority of the lymph nodes are reactive to viral infections of upper respiratory tract, therefore, do not require any treatment.

A) In case of acute suppurative lymphadenopathy secondary to any bacterial focus of infection in the drainage area.
Cap. Cephalexin 250-500 mg every 6 hours for 7 days.
Or
Cap. Amoxicillin 250-500 mg every 8 hours for 7 days.
If lymph nodes persists, perform fine needle aspiration cytology (FNAC) and treat accordingly.
If FNAC is nonconclusive take a biopsy from the enlarged lymph node and treat accordingly.

B) In case of chronic lymphadenopathy perform FNAC and treat accordingly. If FNAC is nonconclusive, perform biopsy and treat accordingly.

Treatment (Tubercular lymphadenopathy)

Start antitubercular therapy (see section on tuberculosis) and reassess the patient after 6 months. If lymph nodes are either not present or less than 1 cm size keep the patient under follow-up and continue treatment. However, if lymph nodes are palpable and more than 1 cm take a biopsy of the node and treat accordingly and consider second line antitubercular drugs.

References

1. The Neck. In: The New Aid's Companion in Surgical Studies, Burnand KG, Young AE, 2nd Edition, 1998, Churchill Livingstone, London pp 451-455.

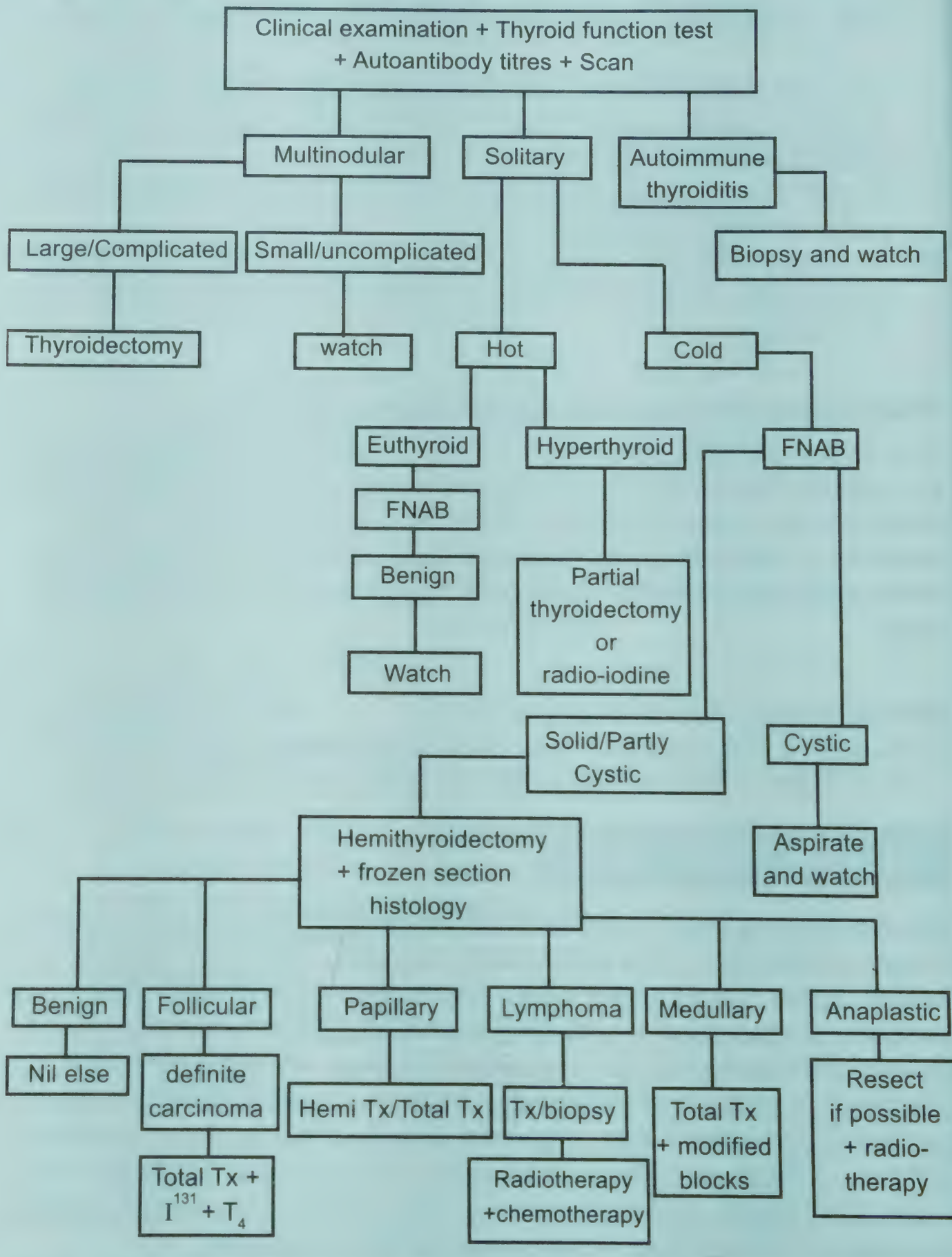
THYROID SWELLING

Thyroid swelling forms one of the most important differential for swelling in front of the neck. The differential diagnosis of thyroid swelling are benign goiter, intrathyroid cysts, thyroiditis, benign and malignant tumours. Simple goitre is enlarged thyroid gland and occurs commonly around puberty in girls due to iodine deficiency. Malignancy should be suspected in case of extreme of age, male sex, rapidly growing swelling, persisting pain, dysphagia, recurrent laryngeal nerve palsy, hardness and fixity of the thyroid gland and presence of one or more palpable neck nodes. Fine needle aspiration cytology, isotope scan and ultrasonography are helpful in differentiating the causes of thyroid swelling.

Treatment

Simple diffuse hyperplastic goitre is preventable by using iodised salt. Treatment with L-thyroxine can reverse the swelling at the stage. Simple nodular goitre is treated by subtotal thyroidectomy (for details see Figure 1).

Figure1. ***Management plan for thyroid nodule***



(Tx-thyroidectomy, T_4-Suppressive thyroxine therapy, FNAB-Fine needle aspiration biopsy)

Thyroidectomy

Preoperative care

Preoperative antibiotic prophylaxis (Inj. Ampicillin 1 g IV 30 min before operation) is given to the patient. Preoperative thyroidectomy indirect laryngoscopy (IDL) is performed to identify compensated or unsuspected recurrent laryngeal nerve palsy. Before operation, thyrotoxic patient should be made euthyroid with antithyroid drugs (carbimazole 0-15 mg 4 times a day and propranolol 20 mg 3 times a day). Fully discuss the potential complications with the patients - mentioning the risk to parathyroid gland and recurrent laryngeal nerve.

Postoperative care

Place patient in a slightly propped up position. Carefully observe for respiratory insufficiency, haemorrhage from the wound, irritability to the facial nerve and carpopedal spasm (parathyroid injury). Monitor drain output daily and remove if 24 hours output becomes lesser than 10 ml. Check wound site for infection and suture removed on the 5th day.

Complications

The most immediate life threatening complication is haemorrhage under deep cervical fascia, which can lead to acute asphyxia. Management include reopening of the suture line, drain the haematoma and re-exploration for control of bleeders. Damage to recurrent laryngeal nerve can lead to respiratory distress (bilateral recurrent laryngeal nerve) and hoarseness of voice. Parathyroid damage leads to hypocalcaemia. Symptomatic hypocalcaemia (positive Chovstek's or Trousseau's sign) or corrected serum calcium level < 8 g/dl is treated with 10% calcium gluconate intravenously. If hypocalcaemia persist, oral calcium supplement and synthetic Vitamin D is necessary.

Late complication includes recurrent thyrotoxicosis (Grave's disease), hypothyroidism, recurrence of malignancy at the local site or in the lymph nodes in the neck.

Radioiodine therapy is indicated in follicular, papillary and mixed carcinoma. Following total thyroidectomy, a total body radioactive isotope scan should be arranged four weeks after the operation. During this period L-thyroxine therapy should be withheld. If radioactive scan shows residual thyroid tissue or metastatic deposit then further dose of radioiodine should be given to ablate these. Following isotope scan, high dose L-thyroxin (0.2-0.3 mg) should be started and continued for life. Radioactive iodine has no role in residual/metastatic medullary carcinoma. Treatment approach to Hurthle cell neoplasm is similar to follicular neoplasm.

Follow up

Patients should be followed at three monthly intervals for the initial 2 years and 6 monthly for next three years and then at yearly interval for life. On each follow up visit patient should be examined for any local or nodal recurrence in the neck, a chest X-ray should be done to exclude pulmonary deposit and clinical features of thyroid toxicity noted and dose of L-thyroxin regulated.

References

1. The Thyroid Gland. In: The New Aid's Companion in Surgical Studies. Burnand KG, Young AE (eds), 2nd Edition, 1998, Churchill Livingstone, London pp 459-485.

BREAST ABSCESS

Breast abscesses can be classified into mastitis neonatorum, lactating epidemic or sporadic mastitis, and non-lactating breast abscesses. Usually caused by highly virulent strains of penicillin resistant *Staphylococcus aureus* and anaerobic *Streptococci.*

Treatment

Nonpharmacological

Rest and support to the breast and to continue breast feeding from both the breasts, however, in case of larger abscess shift to bottle feeding.

Pharmacological

In early stage (induration only):

1. Tab. Erythromycin 500 mg 3 times a day for 7 days.
2. Tab. Metronidazole 400 mg 3 times a day for 7 days.
3. Tab. Ibuprofen 400 mg as and when required.

In case of no improvement or large abscess:

1. Antibiotics as above.
2. Incision and drainage of pus through thinned skin over the abscess (Large abscesses require operation under intercostal block or general anaesthesia).
3. Daily dressing.

In some cases suppress lactation with hormones if the mother finds breast feeding too painful.

Patient education

- To maintain good hygiene and to continue breast feeding from both the sides unless it is a large abscess and very painful.
- Advise on timely weaning of the infant.

References

1. Abscesses in Special Sites. In: Hamilton Bailey's Emergency Surgery, Ellis BW, Paterson-Brown S. Arnold (eds), 13th Edition, 2000, London pp 165-166.

DYSPHAGIA

Dysphagia is the sensation of difficulty in swallowing. It may be due to general causes e.g. myasthenia gravis, bulbar palsy, hysteria etc.) or due to the local causes. The latter may be (a) Intraluminal (e.g. foreign body) (b) Intramural (e.g. achalasia, oesophagitis, oesophageal strictures, Plummer-Vinson syndrome, pharyngeal pouch, benign neoplasm, malignant neoplasm) or (c) Extra luminal (e.g. retrosternal goitre, mediastinal tumor, mediastinal lymphadenopathy, aortic aneurysm, hiatus hernia).

Salient features

- Difficulty in swallowing (solids and/or liquids), oesophageal pain, regurgitation and aspiration.

Investigations

- Barium swallow to evaluate cause, site & extent of the lesion and the state of the oesophagus above & below the lesion; upper GI endoscopy for direct vision evaluation and for taking tissue for histopathological examination wherever indicated.
- Abdominal ultrasound, chest x- ray and other routine investigations.
- CT scan and endoscopy ultrasound to be considered in tertiary care centres, wherever indicated; and oesophageal manometry, pH studies and evaluation for *H. pylori* to be considered in tertiary care centres, wherever indicated.

Treatment

Definitive treatment depends on the cause and its extent.

Nonpharmacological

- Diet restricted to liquids or semi solids depending upon extent of dysphagia.
- Psychotherapy if the patient is depressed or demoralized.

Pharmacological

Gel Magnesium hydroxide + Aluminium hydroxide + Activated Dimethicone (250 mg + 250 mg + 50 mg/ml) 20 ml 6 hourly.

Or

Tab. Ranitidine 150 mg 2 times a day.

References

1. Dysphagia. In: Harrison's Principles of Internal Medicine, Braunwald E, Fauci AS, Kasper DL, Hausen SL et al (eds), Vol. 1, 15th Edition, 2001, McGraw Hill Company Inc., New York, pp 233-235.

ACUTE ABDOMEN

Abdominal pain can occur due to variety of medical and surgical causes. It is important to elicit a detailed clinical history and perform abdominal examination to determine the cause of pain. In very severe cases, it may be necessary to give treatment before proper history can be obtained or examination is allowed by the patient.

Causes of acute abdomen

Abdominal causes

1. Inflammation of peritoneum due to bacterial or chemical contamination. Perforation of appendix or bowel, ulcer, pancreatitis or pelvic inflammatory disease.
2. Mechanical obstruction of hollow viscera-intestinal obstruction, ureteric obstruction due to stone or other causes, obstruction of the biliary tree.
3. Vascular disturbances – vascular rupture, embolism or thrombosis, torsion of pedicle.
4. Abdominal wall injury or infection in the muscles.

Referred pain in case of pneumonia, angina, spine-radiculitis and torsion of testis.

Metabolic causes

Insect bite, lead poisoning, uremia, diabetic ketoacidosis, porphyria and other allergic causes.

Neurogenic causes

1. Organic- Tabes dorsalis, *Herpes zoster*, neuralgia.
2. Functional.

Approach to the patient with acute abdomen

1. In view of the variety of causes, it is absolutely essential to elicit an orderly detailed history about the nature of pain and perform a sequential examination. Narcotics or analgesics should be withheld till the diagnosis is made.

2. A proper history can provide more valuable information than the investigations. The features of the history that must be elicited are site, time and nature of onset, severity, nature of pain, progression, duration, relieving factors, exacerbating factors and radiation. History of GI complaints like vomiting, constipation, haematemesis and melena and urinary complaints should be obtained.
3. Examination of the patient with respect to facies, posture in the bed, respiration can help in localizing the cause and nature of pain. The abdominal examination should be thorough but extremely gentle starting from the nontender area. Points to be noted are area of maximum tenderness, guarding, rebound tenderness, bowel sounds, obliteration of liver dullness and presence of any associated mass or free fluid in the abdomen.
4. It is important not to miss examination of supraclavicular lymphnodes, hernial orifices, peripheral pulsations, genitalia, bowel sounds and rectal and/or vaginal examination.
5. Laboratory investigations depend upon the suspected cause of pain and include haemogram, kidney function tests, liver function tests, serum or urinary amylase and lipase, blood sugar and urinalysis. Special analysis like serum lead estimations may be needed if deemed necessary.
6. Radiological investigations include plain radiographs of abdomen-supine and erect and chest. In a sick patient, lateral decubitus X-ray may provide the same information. Ultrasound, computed tomography and special radiological investigations may be done as and when required.
7. Invasive procedures like endoscopy and laparoscopy are done only if indicated.
8. It may be necessary to rush the patient to operation room if there is suggestion of intra-abdominal haemorrhage along with pain. Any delay for history, examination and investigations can cause more harm to the patient.
9. There may be occasions when the cause of the pain cannot be determined on the basis of clinical examination and investigations. Under such circumstances, it is prudent to provide pain relief to the patient and keep him under observation to watch for development of new signs or symptoms.

Treatment

Treatment of acute abdomen depends upon the cause of pain. In case of medical causes of pain, the offending cause is removed or treated appropriately.

Pharmacological

This depends upon the aetiology of pain.

- In soft tissue lesions or trauma NSAIDs are prescribed.
- In obstruction or colicky pain due to spasm, Tab. Dicyclomine SOS. Initially, injectable administration may be needed for severe pain and later it may be switched to oral route.
- Narcotics may be given in case of severe pain.
- Antibiotics are given for inflammatory causes of pain.

Surgical

Any acute surgical cause of acute abdomen like perforation peritonitis, appendicitis, perforation of ulcer etc. should be treated immediately and appropriately.

Patient education

1. Do not administer analgesics for acute abdomen on your own. This may delay treatment of surgical cause.
2. Enema should not be self-administered for constipation without advise of the treating physician/surgeon.
3. Narcotic analgesics should be taken for minimum period as long term intake may lead to addiction.

References

1. Abdominal Pain. In: Harrison's Principles of Internal Medicine, Braunwald E., Fauci AS, Kasper DL et al (eds), 15th Edition, 2000, McGraw Hill Company Inc., New York, pp 67-70.

CHOLELITHIASIS

Most patients with cholelithiasis have stones exclusively in the gall bladder, but 15% of patients, in addition, have common bile duct (CBD) stones.

Salient features

- Most patients are asymptomatic, some patients present with dyspepsia or vague epigastric pain. The remaining patients may present with recurrent biliary colics or with acute cholecystitis or with symptoms of CBD disease or gall stone or pancreatitis.
- Obesity, fertility and diabetes are known to increase the chances of gall stone formation.
- Diagnosis made clinically and confirmed by ultrasonography.

Treatment

Low fat diet with no spices.

Definitive treatment is cholecystectomy in symptomatic and asymptomatic patients with diabetes or a solitary large stone or multiple small stones with wide cystic duct or porcelain gall bladder or anxious patients. If the patient comes after 48 hours manage conservatively and cholecystectomy after 6-8 weeks.

Expectant management - In case of acute cholecystitis, empyema gall bladder, and stones in the CBD.

Maiantenance IV fluids (for details see section on fluid and electrolyte imbalance)

1. Inj. Ciprofloxacin (Infusion 100 mg/50 ml) 100 ml IV twice a day.
2. Inj. Gentamicin (40 mg/ml) 2 ml IV 8 hourly.

Or

1. Inj. Ampicillin (500 mg/ml) 1 ml IV 6 hourly.
2. Inj. Cloxacillin (500 mg/ml) 1 ml IV 6 hourly.

Or

1. Inj. Ciprofloxacin (Infusion (100 mg/50 ml) 100 ml IV twice a day.
2. Inj. Amikacin (500 mg/2 ml) 2 ml twice a day.
3. In case anaerobic bacterial infection is suspected or anticipated, give Inj. Metronidazole (500 mg/100 ml) 100 ml IV 8 hourly.
4. Inj. Diclofenac sodium (25 mg/ml) 2 -3 ml IM SOS or 6 hourly.

Or

Inj. Pentazocine lactate (30 mg/ml) 1 ml IM SOS.

5. Inj. Hyoscine butylbromide (20 mg/ml) 1 ml IV SOS.
6. In patients having obstructive jaundice, add Inj. Vitamin K (10 mg/ml) 1 ml IM once or twice a day till prothrombin time reaches to a satisfactory level.

Antibiotics are usually stopped after 5-7 days unless the patient has evidence of persistent infection or has indwelling tube (e.g., T-tube).

Patient education

- To avoid fatty & fried meals for 3 months.
- Although ambulation is encouraged as early as possible, heavy physical exertion should be avoided for 2 weeks (after laparoscopic cholecystectomy) and for 3 months after conventional cholecystectomy.
- If T-tube has been placed, it should be removed after 2-3 weeks, after ensuring that the CBD is patent, non dilated and there is free flow of contrast into the duodenum.

References

1. Cholelithiasis and Cholecystectomy. In: Maingot's Abdominal Operations, Zinner MJ, Schwartz SI, Ellis H (eds), 10th Edition, 1977, Prentice Hall International, pp 1717-1738.

APPENDICITIS

Appendicitis is the commonest cause of acute abdomen and may appear as catarrhal appendicitis or as obstructive appendicitis and sometimes it may present as an appendicular lump or appendicular abscess or as burst appendix with peritonitis.

Salient features

- Acute central abdominal pain, followed by nausea, vomiting & fever, with the pain after a variable period, shifting to right lower abdomen localized tenderness maximum at the Mc Burney's point, rebound tenderness and guarding in the right iliac fossa.
- An inflammatory lump in the right lower abdomen or signs of peritonitis.
- A polymorphonuclear leucocytosis and ultrasonographic appearances may help to corroborate the clinical diagnosis. Investigations are primarily undertaken to exclude other conditions like ectopic gestation or ureteric calculus.

Treatment

The definitive treatment is appendicectomy & the sooner it is done, the better. The surgery should be delayed if the patient is moribund with advance peritonitis where the conservative measures will need to be supplemented by measures to make him fit for operation. An interval appendicectomy should be performed where a lump has formed or when attack has already resolved or circumstances make surgery not feasible.

Nonpharmacological

Stop oral feeding.

Pharmacological (Expectant management)

1. Intravenous fluids to maintain hydration. Requirement of fluids would be more if the patient has peritonitis & septicaemia.
2. Inj. Ciprofloxacin infusion (100 mg/50 mg) 100 ml twice a day for 5 days.
3. Inj. Gentamicin (40 mg/ml), 80 mg IV 8 hourly.

   Or

   Inj. Amikacin (500 mg/2 ml), 2 ml IV twice a day.
4. Inj. Metronidazole infusion (500 mg/100 ml) 100 ml IV 8 hourly.
5. Inj. Diclofenac sodium (25 mg/ml) 50 ml IM SOS.

(**CAUTION**: Purgation & enema are contraindicated)

Pain subsides first, followed by relaxation of the abdomen and control of fever. Tenderness disappears later. Polymorphonuclear leucocytosis tends to settle down. Failure of signs & symptoms to subside or the appearance of new signs & symptoms during expectant treatment, calls for surgical intervention.

Postoperative Management

- Oral feeding is started when abdomen is soft, the patient has passed flatus/stools and bowel sounds have appeared. Start with liquids, gradually permitting semi solid & solid diet over a period of 2-3 days.
- Antibiotics should continue for 5 days or more if the condition demands. Initially they are given by parenteral route and later switched to oral route when the patient starts tolerating semi solid diet.
- Patient is discharged usually between 3rd & 5th postoperative day, when he is comfortable, ambulatory, tolerating semi solid or solid food, afebrile and has a healthy wound.
- Sutures are removed around 7th postoperative day.

Patient education

- Normal routine physical work can be permitted in 10-15 days (5-7 days after laparoscopic appendicectomy).
- Moderate physical work is permitted after 4-6 weeks (2 weeks after laparoscopic appendicectomy).
- Heavy physical work is permitted after 2-3 months (4-6 weeks after laparoscopic appendicectomy).

References

1. Appendix and Appendicectomy. In: Maingot's Abdominal Operations, Zinner MJ, Schwartz SI, Ellis H (eds), 10th Edition, 1977, Prentice Hall International. pp 1191-228.

RETENTION OF URINE

Retention of urine is inability to pass urine. It can be either acute or chronic.

a) *Mechanica*l causes of retention are: posterior urethral valves, foreign bodies, tumours, blood clot and stones, phimosis, paraphimosis, trauma (rupture of urethra or bladder), urethral stricture, urethritis, meatal ulcer, tumours, prostatic enlargement-benign or malignant, retroverted gravid uterus, fibroid, ovarian cyst, faecal impaction.

b) *Neurogenic*- Postoperative retention, neurogenic bladder, spinal cord injuries, hysteria, drugs- anticholinergics, antihistaminics, smooth muscle relaxants.

Salient features

- Acute retention of urine is characterized by inability to pass urine despite urge, suprapubic discomfort or severe agonizing pain. There may be previous such episodes or history of trauma, instrumentation or surgery.
- Chronic retention is an enlarged painless bladder whether or not the patient is having difficulty with micturition. Some times acute episode can be precipitated in cases of chronic retention of urine.
- There may be symptoms suggestive of prostatic enlargement in elderly male.
- On examination, there is suprapubic swelling arising out of pelvis in the midline in the hypogastric region that is dull to percussion and cystic in nature. This helps to differentiate from anuria where urinary bladder is not palpable.
- Rectal examination will help to confirm the prostatic pathology in elderly patients. Spinal defects or neurological findings suggest presence of neurogenic bladder.

Treatment

1. General measures include sedation, adequate hydration and antibiotics if sepsis is present.
2. If there is history of trauma, urethral injury should be ruled out before attempting catheterization.
3. If the urethra is patent, a catheter is passed in to the bladder under strict aseptic precautions and is connected to a sterile closed collecting system. The catheter is chosen according to the size of the external

meatus. In cases of acute retention, single catheterization is adequate or an indwelling self-retaining catheter is inserted if deemed necessary.

4. If urethral pathology is present or there is inability to pass the catheter, a suprapubic puncture or cystostomy is performed to relieve the retention.
5. In case of chronic retention, decompression should be performed intermittently (300-400 ml volume) to avoid haematuria that can occur after sudden decompression.
6. The patient should be kept under observation after admission for investigation to elucidate the cause of retention. The investigations include urine examination, renal functions, plain and contrast radiological studies, ultrasound, CT scan or MRI. Urodynamic studies are required to diagnose neurogenic bladder. Cystoscopy can help to diagnose and treat many conditions of the urethra and urinary bladder.
7. Definitive treatment of the aetiology is done after proper investigations.

Pharmacological

1. Tab. Cotrimoxazole (960 mg) 2 times a day

   Or

   Tab. Norfloxacin 400 mg 2 times a day for 5-7 days. This may be changed according to urine culture and sensitivity reports.

Patient education

- Explain catheter care-measures - tip of the urethra should be cleaned with antiseptic solution regularly.
- Watch for blood in urine.

References

1. The Urinary bladder. In: Bailey & Loves Short Practice of Surgery, Russel RCG, Williams NS, Bulstrode CJK. Arnold (eds), 23rd Edition, 2001, pp 1204-1208.

INGUINAL HERNIA

Hernia occur due to raised intra-abdominal pressure due to various causes or weakness of the body wall due to any disease. A hernia consists of the sac, the coverings and the contents of the sac that could be omentum, intestine, circumference of intestine, ovary or Meckel's diverticulum. Most common type of the external hernia is the inguinal hernia, less common being femoral and umbilical. Therefore, management of inguinal hernia is discussed.

Salient features

- Pain and swelling in the groin. The swelling increases as the duration of hernia increases.
- Complications of hernia include irreducibility, incarceration and obstruction, strangulation and inflammation due to inflammation of the contents.

Treatment

Surgical treatment

The treatment of choice for hernia is surgical repair. The surgery is advocated as soon as the diagnosis is made since the complications are common. Even in children, hernia repair is done at the earliest after diagnosis. Any predisposing factors need to be treated first before hernia repair else recurrence is possible. The hernia with complications need to be operated in emergency.

Treatment in children entails herniotomy while in adults repair of the posterior wall of the inguinal canal without (herniorrhaphy) or with prosthesis (hernioplasty) after high ligation and division of the sac is done. This can be done by open repair or laparoscopic repair by the experts. Day care surgery under local anaesthesia is practiced at many centers.

Complications of herniorrhaphy include infection, haematoma formation, injury to viscera like urinary bladder, injury to vas and recurrence.

Nonsurgical treatment -Truss is not advocated for the treatment of hernia except in the extremely frail patients unfit for surgery or where surgery is refused by the patient. Application of external pressure causes trauma to skin and may cause injury to the contents.

Patient education

- Reduce weight and quit smoking before surgery.
- Treatment of any predisposing factors like chronic cough, prostatic enlargement and constipation is necessary.
- The surgery should not be delayed since complications of hernia are frequent and can be serious.
- After surgery, avoid lifting heavy weights, cycling etc. for three months.

References

1. Hernias. In: Maingot's Abdominal Operations, Zinner MJ, Schwartz SI. Ellis H (eds), 10th Edition, 1997, Prentice Hall International, pp 497-580.

SCROTAL SWELLINGS

Scrotal swellings can be either congenital or acquired. The acquired scrotal swellings could be further classified as inflammatory, traumatic or malignant. Important diagnoses include hydrocele, epididymo-orchitis, torsion of testis and tumours.

A. HYDROCELE

This is a collection of fluid in some part of processus vaginalis usually tunica. It can occur in children and adults. Hydrocele could be primary or secondary to testicular diseases like inflammation, infections or malignancy. It can be unilateral or bilateral.

Salient features

- Cystic swelling usually translucent, it is possible to reach above the swelling and it is not possible to feel the testis distinct from the swelling. Although there is history of reduction of size in children, it is not reducible.
- Complications include rupture, haematocele formation, infection (pyocele), calcification and testicular atrophy and herniation through the dartos muscle in long standing cases.

Treatment

In infants, it is advised to wait till the age of two years to allow spontaneous resolution. Beyond the age of two years, the surgical treatment entails herniotomy by the inguinal approach. In adults, definitive treatment requires drainage of the fluid along with eversion of the sac with or without excision of the same. This can be done under local or regional anaesthesia.

B. EPIDIDYMO-ORCHITIS

Epididymo-orchitis is inflammation of the epididymis and the testis due to various causes. It can be acute or chronic. Infection reaches the epididymis via the vas from the lower urinary tract. A history of urinary tract infection is usually available. The condition has to be differentiated from torsion of testis (as given below).

Salient features

- The epididymis and the testis show swelling with shiny edematous skin and tenderness. It may be possible to feel the epididymis and testis separately. The pain is relieved by rest and elevation of testis.

- Urine examination shows pus cells. Complications include secondary hydrocele with clear fluid, abscess formation and pus discharge from sinus formation.

Treatment

Bed rest and scrotal support.

Pharmacological

1. Cap. Doxycycline 100 mg once daily for 8- 10 days. It may be changed according to urine culture and sensitivity.
2. Analgesic and antipyretics may be required.

C. TORSION OF TESTIS

Torsion of testis is most common between ages of 10- 25 years though it may occur at any age.

Salient features

- There is sudden onset of pain in the affected testis and lower abdomen.
- The testis is tender; lies higher as compared to its counterpart; the opposite testis lies horizontally; it is not possible to palpate testis and epididymis separately; pain increases on elevation of testis and secondary haemorrhagic hydrocele.
- Ultrasound examination and colour Doppler examination demonstrate torsion of testis and resultant obstruction of the blood supply.

Treatment (Immediately refer to a higher centre)

Treatment of torsion of testis requires immediate correction by surgical exploration through scrotal incision, untwisting of the cord and orchiopexy. It is important to fix the opposite testis at the same time. It is of paramount importance not to delay the exploration even if diagnosis is doubtful or for the want of special investigations. Any undue delay can lead to gangrene of the testis.

Patient education

- Any scrotal swelling should be brought to notice of your doctor.
- Any sudden onset swelling of the testis merits immediate attention of the surgeon and delay in diagnosis or treatment even for few hours can be harmful.

References

1. Disorders of the Testis, Scrotum & Spermatic Cord. In: Smiths General Urology, Tanagho EA, McAninch JW. (eds), 15th Edition, 2000, McGraw Hill Company Inc., New York, pp 6784-693.

FISSURE-IN-ANO

An anal fissure is an elongated ulcer in relation to anal canal. It most commonly occurs in the midline posteriorly. Most cases are idiopathic and may be due to trauma and ischaemia. Specific causes of fissure are incorrect operation for haemorrhoids, inflammatory bowel disease and sexually transmitted diseases. These can be acute and chronic.

Salient features

- The severe pain on defecation that promotes constipation.
- Bleeding is usually small and occurs as a streak by the side of stools.
- A foul smelling discharge is present in chronic cases.
- On examination, a longitudinal ulcer is seen in the midline posteriorly that may be covered by a skin tag. There is local inflammation and induration.

Treatment

The aim of the treatment is to obtain complete relaxation of the sphincter and provide relief from pain.

Nonpharmacological

- Sitz bath- sitting in a tub containing luke warm water with potassium permanganate to provide relief from spasm and pain.
- Local hygiene.
- High fiber diet to prevent constipation.

Nonsurgical

- 2% Glycerine trinitrate as an ointment for local application.
- Manual dilatation of the anal sphincters-Lord's procedure.

Surgical

- Lateral anal sphincterotomy.
- Dorsal fissurectomy and sphincterotomy.

Complication of surgical treatment could include mild incontinence and prolonged healing time.

Patient education

- Local care of the region and sitz bath should be regularly taken.
- Avoid constipation by the use of high fiber diet and use of purgatives.

FISTULA-IN-ANO

Fistula in ano is a tract lined by granulation that connects superficially the skin around the anus and deeply the anal canal or the rectum. Low level fistula opens into the anal canal below the anorectal ring. The high level fistula opens into the canal at or above the anorectal ring. It is important to know the level of fistula since a low level fistula can be laid open without fear of incontinence.

Salient features

- Persistent seropurulent discharge that may be blood stained.
- Pain and sometimes a history of a perianal abscess that has been drained.
- Fistula in ano may be associated with tuberculosis, Crohn's disease, carcinoma, bilharziasis.
- There is usually an opening within 3-4 cm of the anal orifice with granulation tissue. The fistula heals only to recur later on. Digital examination may reveal the internal opening.

Treatment

Nonpharmacological

Local hygiene and sitz bath. Diet modification to avoid constipation.

Pharmacological

1. Cap. Ampicillin 500 mg every 6 hours.
2. Tab. Metronidazole 400 mg every 8 hours.
3. Bulk laxative to relieve and avoid constipation.

Definitive treatment is fistulotomy (laying open of the fistula tract), fistulectomy (excision of the fistula tract) and use of Seton. Secondary fistula needs treatment of primary disease. High level fistula may need proximal colostomy for treatment.

Patient education

- Do not take treatment for anal disorders like abscess and fistula from unqualified persons.
- Avoid constipation and take bulk laxatives.
- Maintain local hygiene.

Reference

1. Benign Diseases of the Anorectum. In: Maingol's Abdominal Operations, Zinner MJ, Schwatz SI, Ellis H (eds), 10th Edition, 1997, Prentice Hall International. London, pp. 1437-1454.

HAEMORRHOIDS

Haemorrhoids (commonly called piles) are the dilated tortuous veins occurring in relation to the anus. These can be primary or secondary to some other disease like carcinoma of rectum, pregnancy, straining at micturition, or constipation due to any cause. These can be classified into external, internal or mixed (externo-internal) depending on their position in relation to anal orifice.

Salient features

- Many small sized haemorrhoids are asymptomatic. They present with bright red painless bleeding that can be mild or severe. Mucus discharge, prolapse of piles and occasionally pain can also occur.
- Chronic cases develop anaemia due to continuous blood loss.
- On the basis of clinical features, haemorrhoids can be graded -
  - First degree- Bleed only, do not prolapse
  - Second degree- Bleeding occurs, descend down on straining but reduce spontaneously
  - Third degree- Piles prolapse during defecation, but stay prolapsed and have to reposed manually
  - Fourth degree- Piles are large and remain permanently prolapsed
- On examination, there is no external evidence of haemorrhoids in early cases. In advanced cases, haemorrhoids can be seen on straining or are constantly prolapsed.
- Complications of haemorrhoids include strangulation, thrombosis, ulceration, gangrene, fibrosis, suppuration and pylophlebitis.

Treatment

Asymptomatic haemorrhoids do not need any treatment. Secondary haemorrhoids due to concomitant disease also tend to resolve once the underlying disease is cured.

In asymptomatic or mild degree haemorrhoids

Bowel regulation by the use of laxatives, use of high fiber diet, sitz bath and application of topical ointment containing Xylocaine (2%) to relieve pain, if any.

In case bleeding persists despite these measures, second and early third degree piles:

Injection treatment using 5% phenol in almond oil (3-5 ml for each pile)/ rubber band ligation/photocoagulation/cryosurgery/infrared or laser coagulation.

Late third and fourth degree piles

Haemorrhoidectomy or excision of the piles. The complications of surgery include pain, acute retention of urine, reactive bleeding and later on secondary haemorrhage and anal stricture.

Patient education

- Avoid constipation and use laxative if required.
- Use high fiber diet that produces high roughage.
- Sitz bath to reduce pain and spasm.
- Haemorrhoids that prolapse should be reposed gently and not forced back.
- Take treatment for any disease that promotes straining at micturition like benign hypertrophy of prostate.

References

1. Benign Diseases of the Anorectum. In: Maingot's Abdominal Operations. Zinner MJ, Schwatz SI, Ellis H (eds), 10th Edition, 1987, Prentice Hall International, pp 1437-1444.

PAEDIATRIC SURGICAL CONDITIONS

SPINA BIFIDA

Spina bifida is a congenital malformation in which there is incomplete closure of the spinal arch at one or more levels. The disorder can be diagnosed in the antenatal period with ultrasound and a decision regarding continuation of pregnancy can be taken in consultation with paediatric surgeon, obstetrician, neurosurgeon and other specialties.

Salient features

- Spina bifida occulta-defect is seen only on the radiographs. Some sort of cutaneous manifestation may point towards the underlying defect.
- Spina bifida aperta- meningocele, meningomyelocele and syringomyelocele. This category requires immediate decision about the course of treatment after parent counselling.

The lesions have varying degree of associated neurological deficit, musculoskeletal defects. Almost 90% cases have associated hydrocephalus.

Treatment

1. If the lesion is detected on antenatal ultrasound, parent counselling should be done after investigations for other associated congenital malformations.
2. If the parents opt for continuation of pregnancy, they should be referred to a center where facilities of paediatric surgeons or neurosurgeon are available.
3. If a newborn baby is seen with a defect on the back, baby should be taken for immediate surgery after relevant investigation at a center where expert surgical expertise and operating facilities for neonatal surgery are available. At the peripheral center management would include:
   - Isolation of the newborn and prevention of hypothermia.
   - Care of the lesion and back to prevent desiccation and trauma.
   - Nursing in a prone position.
   - Intravenous fluids –10% Dextrose 60 ml/kg/day for the first 48 hours of life.
   - Inj. Ampicillin (500 mg/vial) 100 mg/kg in 4 divided doses.
   - Transfer the baby to a tertiary care center.

Parent education

- If diagnosed in antenatal period, parents are counselled and investigated for severity of lesion and possible outcome.
- Abortion may be advised if associated anomalies are noted in the foetus.

References

1. Management of Spina Bifida, Hydrocephalus, Central Nervous System Infections and Intractable Epilepsy. In: Paediatric Surgery, O'Neill Jr, Rowe MI, Grosfeld JL et al (eds), 5th Edition, 1998, Mosby, St. Louis.

UNDESCENDED TESTIS

ndescended testis is defined as the testis, which cannot be brought to e base of the scrotum without undue tension on the spermatic cord. his anomaly is often diagnosed early but the treatment is delayed due misconceptions leading to various complications.

Salient features

- The testis can be located in the superficial inguinal pouch, inguinal canal or intra-abdominal site. Truly ectopic testis can be present in perineum, femoral region, pubopenile site or contralateral haemiscrotum.
- Differentiate from retractile testis which is occasionally pulled up due to reflex contraction of cremasteric muscle. The retractile testis is normal in size, can be brought down in to scrotum where it stays for some time and the scrotum is normally developed.
- Complications of undescended testis include temperature effects on testis, endocrine effects, germ cell alteration, lower fertility, higher incidence of malignancy, increased incidence of torsion, increased chances of trauma and psychological trauma.

Treatment

1. If the newborn child is seen with unilateral undescended testis, follow up the patient at intervals to see the descent. If testis fails to descend by the age of 12 months, orchiopexy is advised.
   If seen after first birthday the operation of orchiopexy should be done before the age of two years. The operation entails mobilizing the testis and cord structures and fixing it in the subdartos pouch in the scrotum with unabsorbable sutures.
2. If the newborn child has bilateral undescended testes with hypospadias, it should be investigated for intersex disorder.
3. If a child has undescended testis with clinically visible hernia, orchiopexy can be done at an earlier age along with herniotomy.

Patient education

- The parents should be informed about the anomaly if detected at birth and advised to monitor the descent of testis and to get it operated by the age of 1 year.

References

1. Undescended Testis, Torsion and Varicocele. In: Paediatric Surgery, O'Neill Jr, Rowe MI, Grosfeld JL et al (eds), 5th Edition, 1998, Mosby , St. Louis.

ANORECTAL MALFORMATIONS

These are characterized by the absence of the anal opening or an abnormally located anal or rectal opening. These are evident at birth and need urgent attention on behalf of the attending physician. These can be

associated with other congenital malformations like cardiac anomalies, gastrointestinal anomalies, vertebral anomalies, genitourinary system anomalies and limb anomalies.

Treatment

- Isolate the baby,
- Maintain temperature,
- Insert nasogastric tube to rule out esophageal atresia and decompress stomach,
- Reassure and counsell parents .
- Explain prognosis.

Pharmacological

It is required in all the cases that are to be undertaken for surgery in the form of definitive procedure or preliminary colostomy.

1. Intravenous fluids 10% Dextrose 60 ml/kg per day (first 48 hours) and Isolyte P 100 ml/kg body weight thereafter till required.
2. Inj. Vitamin K 1 mg IM stat
3. Inj. Ampicillin 50-100 mg/kg in 4 divided doses for 7 days.
4. Inj. Metronidazole 7.5 mg/kg per day in 3 divided doses for 3 days.

Surgical treatment (Best carried out by a qualified paediatric surgeon)

Figure 1 & 2 depict exmamination and management of anorectal anomalies in male and female new borns.Transfer newborns to such centers for performing the definitive surgery. However, colostomy can be performed at places where expertise for doing definitive procedure is not available.

Anovestibular fistula can be managed by cut back procedure at a peripheral center as initial procedure. Anal stenosis can be managed by anal dilatation.

f unsure, it is safe to perform a sigmoid colostomy before referring the patient to a tertiary care center.

Parent education

Reassure the parents and explain the nature of anomaly and also explain that the child would require multiple surgical procedures to correct the malformation.

Teach the parents the care of the colostomy – not leaving it open, cleaning around it with soft cotton cloth soaked in water, not rubbing over the colostomy to prevent bleeding, management of prolapsed colostomy and follow-up schedule.

eferences

Anorectal Malformations. In: Paediatric Surgery. O'Neill Jr., Rowe MI, Grosfeld JL et al (eds), 5th Edition, 1998, St. Louis.

Figure 1. ***Male***

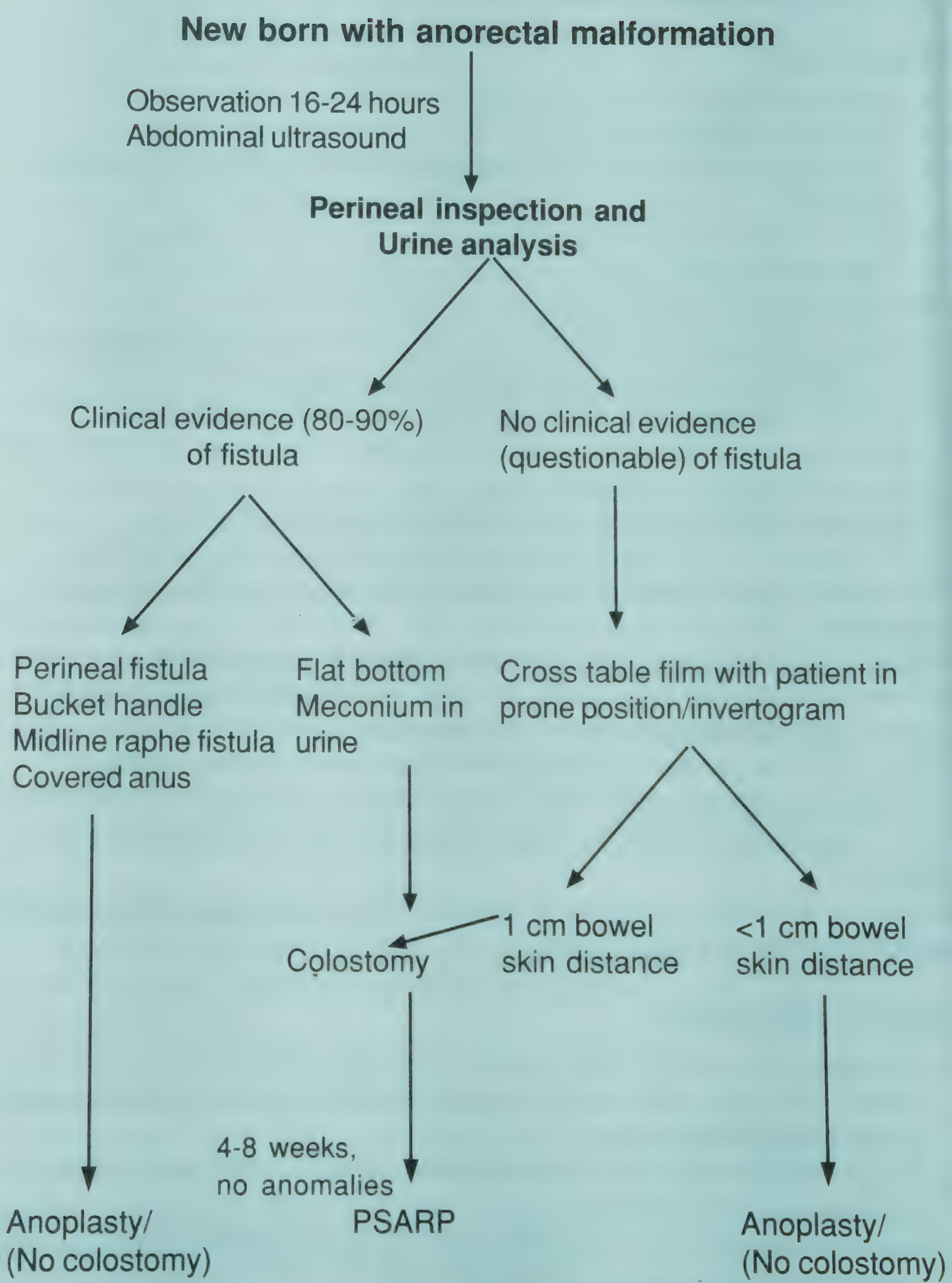
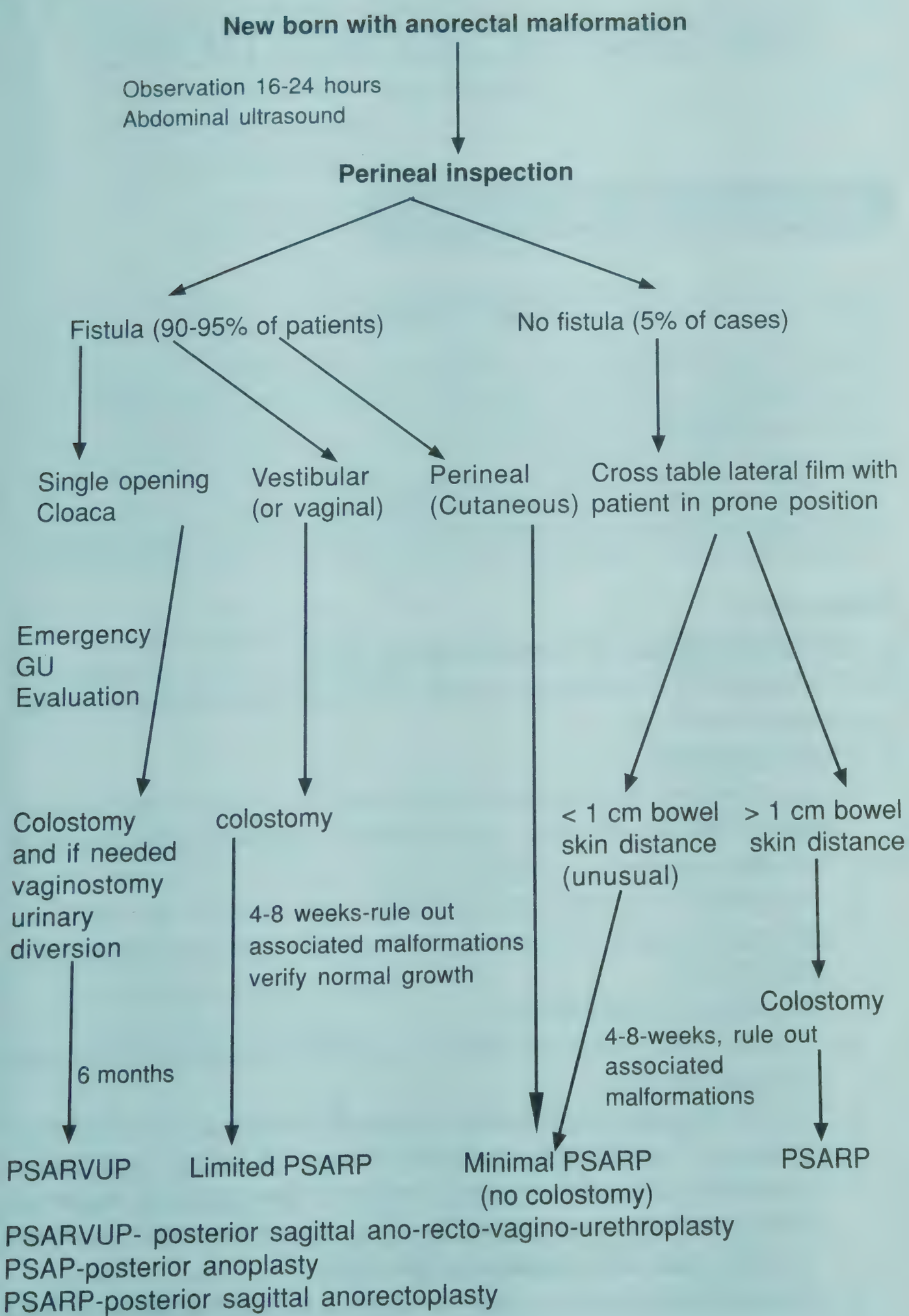


Figure 2. ***Female***



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PAEDIATRIC CONDITIONS

ESSENTIAL NEWBORN CARE

Salient features

The components of essential newborn care include

- Establishment of breathing at birth and neonatal resuscitation.
- Prevention of hypothermia.
- Prevention of infection.
- Early and exclusive breast feeding.
- Early identification and appropriate referral of high-risk newborns.

Treatment

1. Establishment of breathing at birth

Most newborns cry immediately at birth and therefore need no assistance to establish breathing.

2. Hypothermia

A. Identification of hypothermia. An axillary (or rectal) temperature <36.0°C is hypothermia. Such a baby would feel cold to touch on the abdomen and periphery.

B. Identification of cold stress: Baby's peripheries are cold but abdomen is warm. This usually corresponds to axillary temperature of 36-36.4°C.

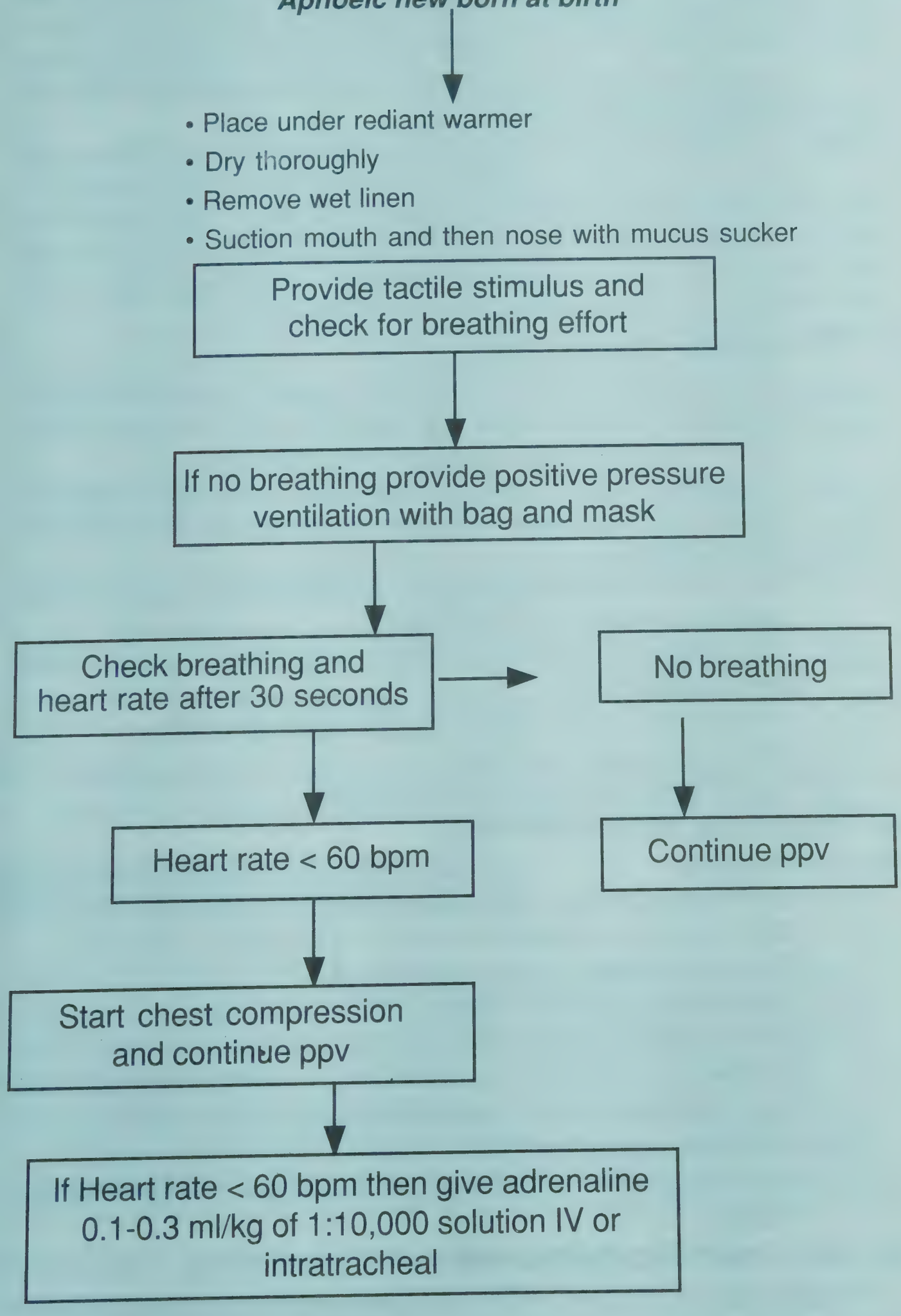
C. Prevention of hypothermia.

a. Dry the baby with warm dry linen at birth. Discard wet linen and wrap in dry linen.

b. Place baby after birth under a radiant warmer or 200 Watt bulb (placed at a distance of 45 cm above the baby). If neither is available, place the newborn infant on the mother's abdomen and wrap baby and mother together to prevent heat loss from the exposed skin surfaces of the baby.

c. Ensure that there are no open windows or fans turning in the delivery area where baby is being delivered or being observed.

Figure 1. ***Algorithm for neonatal resuscitation***


Apnoeic new born at birth
• Place under rediant warmer
• Dry thoroughly
• Remove wet linen
• Suction mouth and then nose with mucus sucker
Provide tactile stimulus and check for breathing effort
If no breathing provide positive pressure ventilation with bag and mask
Check breathing and heart rate after 30 seconds
No breathing
Continue ppv
Heart rate < 60 bpm
Start chest compression and continue ppv
If Heart rate < 60 bpm then give adrenaline 0.1-0.3 ml/kg of 1:10,000 solution IV or intratracheal

ppv - positive pressure ventilation
bpm - breaths per minute

d. Delay bathing of newborn for the first few days; this will prevent hypothermia. However, baby may be wiped with warm clean water to remove dried blood, vernix or secretions. Care must be taken to ensure that the room is warm and draught free when the baby is being cleaned or bathed. The baby should immediately be wrapped in dry linen after being wiped dry.

e. After birth and for the first few days thereafter keep mother and baby in close proximity with baby being adequately clothed. In cold weather, the baby must have 2 layers of cotton vest with a woollen sweater, cap, socks and legs should be covered and baby should be wrapped in a blanket. In summer, cotton dress with a cotton diaper wrapped in a cotton cloth.

3. Prevention of infection

a. Always clean hands with soap and water and wear sterile gloves if available before conducting the birth of the baby and while examining babies during the first few days of life.

b. A sterilized blade (if that is not available a new razor blade or a blade boiled for at least 20 minutes) must be used for cutting the cord at delivery.

c. The cord tie used must be sterile or boiled for 20 minutes before used for tying the cord after birth.

d. The surface for conducting delivery and placing the baby after birth must be clean.

e. Do not apply anything to the cord or eyes after birth.

f. Do not give prelacteal feeds.

g. Give exclusive breast-feeding from birth.

4. Exclusive breast-feeding

Advise mothers to

a. Start breast feeding within one hour of birth.

b. Not to give any prelacteal feeds such as honey, water, etc.

c. Give breast feeds to baby on demand.

d. Give the baby exclusive breast feeding for at least first 6 months of life. However, there may be situations where it may not be possible to provide human milk i.e., maternal death, severe maternal illness, HIV positive mothers and documented lactational inadequacy.

e. Not to give water to the baby during period of exclusive breast feeding.

5. Early identification of high risk newborns

Babies born to mothers with eclampsia, antipartum haemorrhage, diabetes etc are considered as high risk newborns and delivery should be conducted at a centre where all facilities for the care of the newborn

are available. The following examination at birth or during the first few days would help detect high risk babies who are in need of immediate referral to an appropriate health facility which has adequate newborn care.

a. **Weigh baby**. Babies with birth weights <2000 g are at increased risk of morbidity and mortality and need careful assessment by a physician trained in child health.
b. **Examine for major malformations**. Most major and life threatening malformations such as neural tube defects, esophageal and anal atresias, diaphragmatic hernia, etc. can be detected at birth by careful examination. Some important clues to a underlying malformation is non-passage of meconium at 24 h of age or non-passage of urine at 48 h after birth.
c. **Sucking, activity and cry**. Newborn infants who have poor sucking, are less active than normal and have a weak cry are very ill and need immediate referral.
d. **Respiratory distress**. Babies who have a respiratory rate of >60 bpm (counted for atleast 1 minute and persisting on repeat count) or have severe subcostal retractions have respiratory distress and need immediate referral.
e. **Identification of severe jaundice**. Yellow staining of the skin within 24 h of age or when yellow staining of the skin includes the palms and soles at any age, this is severe jaundice and needs immediate referral.

6. **Immunization**. All newborns delivered at a health facility should be given BCG and one dose of oral polio vaccine within 24 hours of birth.

LOW BIRTH WEIGHT BABIES

Salient features

- Low birth weight (LBW) baby is the one who weighs less than 2500 g at birth.
- Low birth weight may result from either prematurity (gestational age <37 weeks) or intrauterine growth retardation (IUGR), which is also called small-for-date baby.

Treatment

Indications for hospitalization are:
Birth weight of less than 1800 g; Gestation age of less than 34 weeks; Neonate who is not able to take feeds from the breast or by cup (katori)

and spoon (irrespective of birth weight and gestation); and a sick neonate (irrespective of birth weight and gestation).

1. Keep the LBW babies warm:
   Room temperature should be kept between 28-30°C. Following methods may be used:
   - Maternal-baby skin to skin contact (Kangaroo mother care). Place the naked baby between the mother's breast. Wrap baby and mother with a shawl. Cover the baby's head with a cap.
   - Proper clothing - cap, woollen sweaters, socks and mittens.
   - Blankets.
   - Overhead radiant warmer.
   - Incubator.
2. Nutrition-Guidelines to provide fluids and nutrients to LBW babies.

Age	**Category of Neonates**		
Birth weight	**<1200 g**	**1200-1800 g**	**>1800 g**
Gestation	**<30 weeks**	**30-34 weeks**	**>34 weeks**
Initial	Intravenous fluids (60 ml/kg/day) with feed	Gavage (60 ml/kg/day)	Breastfeeding. If unsatisfactory, give katori/spoon feeds
After 1-3 days	Gavage (15-30 ml/kg/d), increase by 15-30 ml/kg/day to a maximum of 180 ml/kg/day of expressed breast milk	Katori/spoon Maximum of 150-180 ml/kg/d	Breast
Later (2-4 weeks)	Katori/spoon (150-180 ml/kg/day)	Breast	Breast
After some more time (4-6 weeks)	Breast	Breast	Breast

3. Vitamin K 1.0 mg IM at birth.
4. Vitamin A 1000 IU orally daily - from 1 week age onwards.
5. Vitamin D 400 IU orally daily - from 2 week age onwards.
6. Iron 2 mg/kg/day orally daily - from 6 weeks age onwards.
7. Vitamin E, calcium and phosphorus supplementation in very LBW (<1500 g, <32 week gestation).

Early detection of sickness by periodic evaluation - Referral to higher centre in the presence of any one or more of the following signs: Lethargy, refusal to feed, hypothermia, respiratory distress, grunt, apnoea, abnormal

weight gain pattern, jaundice over soles and palms, abdominal distension, feed intolerance, cyanosis, pallor, sclerema, seizures and bleeding.

NEONATAL JAUNDICE

Salient features

- Jaundice is a common physical finding (manifesting as yellowness of the skin of the face when the serum bilirubin level exceeds 5 mg/dl) during first week of life.
- As the degree of jaundice increases, there is a cephalopedal progression of jaundice. Yellow, colouration of trunk indicates the serum bilirubin to range between 10 to 12 mg/dl, whereas staining of palms and soles is ominous as it indicates a serum bilirubin of more than 15 mg/dl.
- In more than 90% of all neonatal jaundice is physiological and does not need any specific therapy. It is recognized by its characteristic timetable: jaundice appears between 24 and 72 hours of age, its maximum intensity (peak serum bilirubin always below 15 mg/dl) is seen on the 4^{th} to 5^{th} day of life and usually disappears before 14 days of life.
- About 5% of newborn babies develop pathological jaundice or hyperbilirubinaemia. It should be considered a medical emergency as it may cause bilirubin encephalopathy or kernicterus when unconjugated bilirubin exceeds 20 mg/dl (term baby) or lower levels (preterms). Pathological jaundice is recognized by any of these features: jaundice appearing within 24 hours, serum bilirubin levels exceeding 15 mg/dl (term) or lower levels (preterms) and persistence of jaundice beyond two weeks of age.
- If jaundice persists beyond 2 weeks, the baby should be investigated for cholestatic (obstructive) jaundice.

Treatment

There are two important modalities of treatment:

1. **Phototherapy:** Most preterm babies are placed under phototherapy, when their serum bilirubin approaches 10-12 mg/dl, and term babies are given phototherapy when their serum bilirubin approaches 15 mg/dl. During phototherapy, the naked infant (with covered eyes) is kept about 45 cm below the phototherapy unit comprising of blue or white tubes of halogen lamps. Non-breastfed babies should be provided

additional fluids at the rate of 20 ml/kg/day. Many babies while undergoing phototherapy may pass greenish-yellow stools which by themselves are not harmful as long as baby is active.

Assessment of severity of jaundice by looking at the skin is unreliable. Estimation of serum bilirubin is necessary to monitor response to therapy.

2. **Exchange transfusion** should be promptly performed, if any of the following exist:

a. In babies with Rhesus hemolytic disease of the newborn:

1. Cord of 10 g/dl or less.
2. Cord bilirubin of 5 mg/dl or more.
3. Unconjugated serum bilirubin of more than 10 mg/dl within 24 hours or rate of rise of more than 0.5 mg/dl/hour.

b. In babies with jaundice due to other causes

1. Unconjugated serum bilirubin of 20 mg/dl or more in term baby.
2. In preterm babies, serum bilirubin of more than 1.0 mg/100 g weight of the infant (i.e. 10 mg/dl for 1000 g and 15 mg/dl for 1500 g and so on).
3. In the presence of asphyxia, respiratory distress, sepsis, hypothermia, exchange is performed at about 2 mg/dl lower serum bilirubin level than is otherwise indicated.

MANAGEMENT OF COMMON CLINICAL PROBLEMS IN NEWBORNS

Regurgitation of feeds and vomiting: unlike vomiting, non-projectile expulsion of stomach contents without force (regurgitation) is normal and simply needs advice regarding feeding technique.

Bowel disorders: no medication should be prescribed for passage of stools after each feed (exaggerated gastrocolic reflex) as this is normal in some babies. From 3rd to 14 days many exclusively breast-fed babies pass loose stools (10-15 times/day) without illness/dehydration. These are transitional stools and require no medication.

Delayed passage of urine: non-passage of urine by 48 hours after birth may suggest urinary tract anomalies. Such babies need to be investigated. Crying before passing urine is normal.

Jitteriness: is abnormal only when it is excessive or persists even during feeding and then it may suggest hypoglycaemia or hypocalcaemia.

Dehydration fever: transitory moderate fever (up to 38.5°C) usually during the second or third day of life in summer months in an active baby, who sucks well, is normal and responds to lowering the environmental temperature.

Excessive crying: most baby cry when either they are hungry or are having discomfort such as due to full bladder before passing urine, wet napkin, nose block etc. Excessive inconsolable crying or high-pitched crying is indicative of meningitis or any other painful inflammatory conditions.

Umbilical sepsis: if there is pus discharge not extending to periumbilical skin, apply 10% Gentian violet or povidone iodine locally twice a day. However, if there is periumbilical erythema administer syrup erythromycin 40 mg/kg/day in 3-4 divided doses.

If the newborn has any other high risk factor, refer to a higher centre.

Umbilical granuloma: a red flesh-like nodule at the base of umbilical cord can be managed by cautery with silver nitrate or application of common salt for 3 to 4 days.

Engorgement of breasts in both sexes and vaginal bleeding after 4 days of birth is normal.

Tongue-tie: rarely requires surgical intervention.

IMMUNIZATION SCHEDULE

There are now a number of vaccines available for childhood immunization. However, there are those which are considered essential for all children because the infections which they protect against are important national causes of childhood morbidity and mortality. **Appendix IX and X provide a ready reckoner of such vaccines.**

National immunization schedule (Universal Immunization Program)

- BCG : Birth or 6 weeks.
- OPV : Birth, 6, 10, 14 weeks, 15-18 months.
- Hepatitis B : Birth, 6, 10, 14 weeks
- DPT : 6, 10, 14 weeks, 15-18 months.
- Measles : 9 months.
- MMR : 15-18 months.
- DT : 5 years.
- TT : 10 and 16 years (if given for first time at this age, give 2 doses at 4 weeks Interval).

2. General comments on vaccines

a. Different vaccines can be given at the same time.
b. A gap of 1 month is recommended between 2 live vaccines if not given together.

c. Generally there is no need to restart immunization if the gap between immunization doses is more than the recommended interval.
d. DPT, DT, TT, Typhoid (Vi) and Hepatitis B vaccines should not be frozen.
e. Vaccines are generally stored between + 2°C and +8° C.

References

1. National Child Survival and Safe Motherhood Programme. Maternal and Child Health Division, Department of Family Welfare, Ministry of Health and Family Welfare, Government of India, 1994.
2. Resuscitation in the Delivery Room. In: Avery's Diseases of the Newborn. Taeusch HW, Ballard RA(eds), 7th Edition, 1998, WB Saunders Co., Philadelphia, pp 319-333.

FLUID AND ELECTROLYTES

Fluid and electrolyte therapy is divided into three phases:

a) Correction of preexisting deficits; The losses, via renal or extrarenal route, should be estimated and corrected as soon as possible; for example, rehydration therapy for diarrheal dehydration.
b) Provision of maintenance requirements for normal metabolism.
c) Correction of ongoing losses. These may occur via the gastrointestinal tract through losses (as in diarrhea, vomiting etc.) or removal (suction, aspiration etc.). Replacement of such losses should be similar in type and amount to the fluid being lost.

Out of these three phases, we shall discuss the maintenance requirements here. Correction of preexisting deficits and correction of ongoing losses shall be discussed, wherever relevant (See Section on diarrhoea and dehydration).

Maintenance requirements in children

A guideline for estimating daily fluid and electrolytes requirement in a normal child under normal conditions is: Water-100 ml/100 Kcal/day; Sodium-1-3 mEq/100 Kcal/day; Potassium-1-2 mEq/100 Kcal/day. Hence the fluid requirement based on caloric requirement for different weight groups can be calculated as follows:

Weight	Fluid requirements
3-10 kg	100 ml/kg/day
10-20 kg	1000 + 50 ml/kg/day for each kg >10.
> 20 kg	1500 + 20 ml/kg/day for each kg >20.

Maintenance fluid requirement replaces water loss through skin (2/3 of losses), GIT, respiration, and urine. These losses are affected by ambient humidity, clothing, body temperature, respiratory rate, and age of the

child. Situation specific adjustments are necessary when calculating maintenance fluids.

Refer to the section on newborn care for guidelines on fluid therapy in neonates and those weighing <3.0 kg.

The most commonly employed intravenous maintenance fluid employed in children is N/5 (0.18%) sodium chloride in 5% glucose + potassium chloride 20 mEq/Liter. Commercially it is available as Isolyte P, Kidral etc. C

Maintenance requirements in newborns

The table below provides the normal fluid electrolyte requirements in newborn babies.

Age (Days)	Total fluids (ml/kg/day)	Glucose/Dextrose	Electrolyte
1	60	10% Dextrose in water	None
2	70-80	-do-	None
3	80-90	-do-	Sodium 2-3 mmol/kg/day Potassium 2 mmol/kg/day
4	90-100	-do-	-do-
5	100-110	-do-	-do-
6	110-120	-do-	-do-

- From day 3 onwards, fluid containing glucose-electrolyte mixture can be provided using commercially available paediatric maintenance intravenous solutions.
- The fluid and electrolyte requirements from day 7-28 remains the same. However, in babies <1500 g the fluid requirement after day 7 need to be increased by 10-20 ml/kg/day till a maximum of 150 ml/kg/day.

Conditions that increase fluid requirement

- Fever: for every 1°C increase over 37.5°C, the fluid requirement increases by 10 ml/kg/day.
- Phototherapy: this increases fluid requirement by 10-20 ml/kg/day.

Conditions that decrease fluid requirement

- Congestive cardiac failure: Fluid requirements are reduced to 2/3 of the normal need for that age.
- Renal failure: In cases of decreased urinary output, the fluid regimen is 400 ml/m^2/day for insensible water losses plus urinary output over the day. Potassium should be added with caution or omitted in suspected cases of acute renal failure.

HYPONATRAEMIA

Defined as serum sodium <130 mEq/L. This may be associated with increased or decreased extracellular water (ECF), evidenced by an acute

increase or decrease in body weight respectively. Clinical symptoms appear when levels fall below 120 mEq/L. These include drowsiness, seizures and coma. Acute hyponatraemia is associated with hypotension, and circulatory failure.

Treatment

1. If fluid overload, renal failure, or SIADH is present, restrict fluid intake to 2/3 of the normal maintenance.
   If dehydration is present, expand ECF volume by giving isonatremic fluids intravenously depending on the degree of dehydration.
2. Sodium. Acute symptomatic hyponatraemia is treated with administration of 3% sodium chloride 1-2 ml/kg/h till symptoms resolve. Chronic hyponatraemia should be corrected over a period of 48 hours. The deficit is calculated as follows:
   Sodium deficit = [desired Na+ - present Na+] x weight x 0.6

HYPERNATRAEMIA

Defined as serum sodium >150 mEq/L. Consequent to i) excessive administration of sodium (accidental salt administration in ORS), ii) inadequate water intake or iii) excessive water losses. Symptoms are non specific or relate to CNS such as altered sensorium or convulsions.

Treatment

- Identify and treat the underlying cause.
- Replace water deficit as assessed by degree of dehydration over a period of 48 hours with a solution containing 40 mEq/L of sodium. Over rapid correction may lead to cerebral oedema. (**CAUTION**: Sodium free solutions are never used except when hypernatraemia is acute i.e. onset within few hours).
- Serum sodium >180 mEq/L may require urgent dialysis.

HYPOKALAEMIA

Defined as serum potassium <3.5 mEq/L. Clinical symptoms include muscle weakness, hypotonia, and paralytic ileus. ECG changes include ST depression, T wave flattening/inversion, U waves and arrhythmias.

Treatment

- Identify and treat the underlying cause.

- Correct the deficit with potassium supplements @ 40 mEq/L of fluids. The amount of fluid is dictated by the hydration status of the child. Potassium chloride may be given orally (15 ml = 20 mEq). Intravenous correction with KCl (1 ml = 2 mEq) is required when patient is unable to take orally, serum potassium is < 2.5 mEq/L, has respiratory paralysis, or in presence of arrhythmia.
- Correct the potassium deficit over a period of 24 hours.
- Potassium rich foods such as banana or fruit juice may be advised on long term basis, specially in undernourished children.

HYPERKALAEMIA

Defined as serum potassium >5.5 mEq/L. Symptoms include weakness, parasthesias, and tetany. ECG changes are characteristic including high peaked T waves, prolonged PR interval, widened QRS complex, heart blocks, and arrhythmias in that order.

Treatment

1. Mild hyperkalaemia: Serum K^+ 5.5 to 6.0 mEq/L is managed by stopping the potassium intake and offending drugs such as potassium sparing diuretics, correction of acidosis and intravascular volume.
2. Moderate hyperkalaemia (serum K^+ 6 to 8 mEq/L or peaked T waves) is managed by administering a glucose insulin infusion (0.5 g/kg glucose with 0.3 U regular insulin/g glucose, over 2 hours) and/or a sodium bicarbonate infusion (2 mEq/kg over 5-10 min), in addition to the measures already mentioned. Can be repeated 4-6 hourly.
3. Patients with severe hyperkalaemia (serum K^+ >8 mEq/L or ECG changes apart from tall T waves) should be urgently administered intravenous 10% calcium gluconate 0.5 ml/kg over 5-10 minutes. This immediately reverses the cardiac effects of hyperkalaemia. This should be followed up with the measures as for moderate hyperkalaemia. Intravenous Salbutamol (4 mcg/kg in 5 ml water) or nebulised salbutamol (2.5-5.0 mg) given over 15-20 minutes also acts rapidly to lower serum K^+. Dialysis has to be done in case the hyperkalaemia is refractory to therapy as in renal failure.
4. Monitoring of the therapy should be done with ECG and serum potassium levels.

References

1. Fluid and Electrolytes. In: Paediatric Emergency Medicine. American College of Emergency Physicians, Strange GR, Ahrena W, Lelyveld S et al (eds), 1996,

McGraw Hill Company Inc., New York, pp 339.
2. Maintenance of Normal Fluids. In: Manual of Paediatric Therapeutics,1990, Boston, Little Brown and Co. pp 189-197.
3. Fluid and Electrolyte Therapy. In: Current Paediatric Therapy.1999, Philadelphia, WB Saunders, pp 860-869.

ANAEMIA

A haemoglobin (Hb) level below 11 g/dl for children 6 months to 6 years old, and <12 mg/dl for children 6-14 years is considered as anaemia. Anaemia can result either from decreased RBC production, increased RBC destruction, or excessive blood loss. In some patients more than one mechanism may be operative.

1) **Anaemia due to decreased RBC production** may be due to:

a) Deficiency of one or more of haematopoietic nutrients i.e. iron, folic acid, and vitamin B12. Deficiency of other nutrients such as copper, protein etc. is uncommon.

b) Bone Marrow infiltration due to abnormal cells as in acute and chronic leukaemia, disseminated malignant diseases, myelofibrosis etc.

c) Bone marrow aplasia -congenital and acquired aplastic anaemia (severe and moderately severe) and pure red cells aplasia such as Diamond - Blackfan syndrome, transient erythroblastopenia of childhood.

2) **Anaemia due to increased RBC destruction** i.e., haemolytic anaemia. Commonest hemolytic anaemia seen in this part of the country is β thalassaemia major. Others include sickle cell disease, hereditary spherocytosis, G6PD deficiency, immune hemolytic anaemia etc.

3) **Anaemia due to excessive blood loss** -usually in such cases, the site of bleeding is obvious e.g. massive esophageal variceal bleeding, rectal polyps etc. In cases like ankylostomiasis, Meckel diverticulum etc. there may be only occult bleed.

Clinical approach in a child with anaemia- Careful history and physical examination provide useful clues towards the likely cause of anaemia, thereby guiding the most appropriate laboratory tests required to avoid unnecessary expenses in diagnosis, e.g.

a. Nutritional iron deficiency anaemia (IDA) is uncommon below 6 months of age in term born child with normal birth weight.

b. Most thalassemics are normal at birth and usually start becoming anaemic between 6 -18 months of age.

c. Constitutional aplastic anaemia (Fanconi pancytopenia) presents between 5-10 years, whereas congenital pure red cell aplasia can manifest in first few months.

d. Megaloblastic anaemia occurs in infants and toddlers preschool children

with prolonged exclusive breast feeding by undernourished mothers.

e. Presence of splenomegaly and haepatomegaly suggests the diagnosis of either haemolytic anaemia or leukaemias (usually there is associated lymphadenopathy) or anaemia of chronic infection/ inflammation.

f. Presence of petechial and/or purpuric spots is suggestive of concomitant thrombocytopenia and points towards the diagnosis of acute leukaemias, aplastic anaemia or megaloblastic anaemia.

Investigations

Initial investigations to be carried out in cases of anaemia - estimation of Hb %. TLC, DLC and platelet count, examination of peripheral blood smear for RBC size and shapes, anisopoikilocytosis, presence of immature cells and haemoparasites, reticulocyte count. Currently, most of the laboratories use electronic cell counters for haematological investigations which give additional useful information such as MCV, MCH, MCHC etc.

Following important information can be gathered from the above investigations:

a. Type of anaemia -on the basis of cell size -such as microcytic (MCV<80fl), normocytic and macrocytic (MCV>90fl) –and on the basis of Hb content i.e. hypochromic or normochromic.

b. Associated thrombocytopenia and/ or neutropenia (bicytopenia or pancytopenia) is suggestive of aplastic anaemia, megaloblastic anaemia, or bone marrow infiltration due to leukaemia, etc.

c. Increased, normal or decreased reticulocyte count is suggestive whether anaemia is due to decreased production or increased destruction of RBCs.

Following section describes the differential diagnosis of cases of anaemia according to preliminary investigations results-

a. Microcytic hypochromic anaemia - two important causes are-

i) IDA - reticulocyte count is normal or mildly elevated.

ii) Thalassaemia major - reticulocyte count is usually 4-6%. Peripheral smear also shows target cells and numerous nucleated RBCs. Elevated foetal haemoglobin (HbF) on blood electrophoresis confirms the diagnosis.

Lead poisoning and pyridoxine responsive anaemia, sideroblastic anaemia and copper deficiency are rare.

b. Macrocytic normochromic anaemia –

i) Megaloblastic anaemia of B_{12} and folate deficiency are the commonest and may have associated neutropenia and/or thrombocytopenia, Reticulocyte count is usually low. Bone marrow examination reveals megaloblastic changes.

ii) Other causes of macrocytic anaemia are liver diseases, hypothyroidism, thiamine deficiency and some inborn errors of metabolism.

c. Normocytic normochromic anaemia - This group comprises a large number of causes -

i) Congenital or acquired aplastic anaemia –usually have bicytopenia or pancytopenia and decreased reticulocyte count. Bone marrow aspiration or biopsy is confirmatory.

ii) Bone marrow infiltration such as leukeamia and other neoplasms, storage disorders, myelofibrosis etc. Diagnosis is confirmed by bone marrow examination.

iii) Hemolytic anaemia -such as immune haemolysis, hereditary spherocytosis, G6PD deficiency etc. Reticulocyte count is increased.

iv) Anaemia resulting from acute blood loss.

IRON DEFICIENCY ANAEMIA (IDA)

Salient Features

Iron deficiency anaemia commonly occurs in children due to nutritional deficiency. However, IDA is uncommon in term breast fed children but prematurity, perinatal blood loss or cow milk feeding may lead to IDA in infancy. It is characterised by pallor, irritability, pica and absence of organomagaly and lymphadenopathy (10-15% may have mild splenomegaly).

Treatment

Nonpharmacological

After the period of exclusive breast feeding (6 months) cereal based diet should be added. Encourage green leafy vegetables and fruits.

Pharmacological

Severe anaemia (Hb <4-5 g/dl)

Blood transfusion:

1. Give packed cell transfusion, usually 2-3 ml/kg at one time under close monitoring to severely anaemic children (Hb <4-5 g/dl).
2. Inj. Frusemide (1 mg/kg/dose) may be administered if there is evidence of cardiovascular overload.

Mild to moderate anaemia

Initiation of therapy: Oral ferrous salts (sulfate, gluconate, etc.) are the

preferred therapeutic iron preparation.
Syp./Drops/Tab. Ferrous Sulfate/Ferrous gluconate/Ferrous fumarate 3 mg/kg/day of elemental iron in 2-3 divided doses to be given between meals for 8 weeks after normal Hb concentration for age is achieved.
Usual Iron preparations have 35-50 mg elemental iron per 5 ml of syrup or per ml of drops. Elemental content of various ferrous salts is -Ferrous sulfate 20%, Ferrous gluconate 12%, Ferrous fumarate 33%, Colloidal iron 50%.
(**CAUTION**: Milk/tea should particularly be avoided one hour before or after the drug. Not to be given along with calcium preparations).

Response to therapy

Decreased irritability and improved appetite is seen in 12-24 hours. Reticulocytosis is seen within 2-3 days and rise in Hb is noticeable by 5th - 7th day. Rate of rise of Hb is 0.25–0.4 g/dl/day (daily or even weekly estimation of Hb% is not required). Usually normal Hb levels are obtained by about 8–12 weeks.
If the response is inadequate, check for the prescribed dose, compliance, presence of diarrhoea and/or malabsorption, infections (particularly urinary tract infection and tuberculosis), occult blood loss or β thalassaemia trait which may have been misdiagnosed as IDA.

Modification or step up therapy

Parenteral iron therapy is very rarely required, however, it is necessary if there is interference to absorption of oral iron, chronic diarrhoea or malabsorption, occult bleeding from GIT when oral iron therapy may not maintain desired Hb. Parenteral iron therapy may also be used in severely anaemic child not likely to take oral therapy because of socioeconomic reasons.
When parentral iron is required, the total dose may be calculated:

$$\text{Dose of iron required (mg)} = \text{wt (kg)} \times 2.5 \times \text{Hb deficit}$$

Hb deficit is the difference of desired normal Hb and present Hb. To this dose, 10 mg/kg should be added for replenishing the stores.

Inj. Iron Dextran or Iron Sorbitol Citric acid complex (50 mg/ml) deep gluteal IM injection (preferred) or infusion after a test dose. The total dose of iron may be given as a single dose IV or as multiple daily doses IM not exceeding 5 mg/kg/dose spread over several days if the volume is too large.

Patient/parent education

- IDA occurs generally due to dietary deficiency of iron. Once the diet is modified, the patient should stick to that diet.

- Iron medicine should be taken between meals and never along with milk or tea.
- Intake of iron medicine usually causes harmless black discoloration of the teeth and stools. The teeth discoloration can be prevented by rinsing the mouth with water after doses.
- Increase in Hb levels with iron therapy will take approximately 5-7 days and about 12 weeks for desired normal Hb level to be achieved.

References

1. Diseases of the Blood. In: Nelson's Textbook of Paediatrics. Behrman, Kliegman & Jenson (eds), 16th Edition, 1999, W B Saunders Co, pp 1456-1472.

PROTEIN ENERGY MALNUTRITION (PEM)

Nutritional marasmus and kwashiorkor are two extreme forms of malnutrition. Such extreme forms are rare; most cases suffer from mild and moderate nutritional deficit.

Salient features

- Milder forms may just present with failure to thrive i.e. decreased rate of weight gain.
- Marasmus is characterized by gross wasting of muscle and subcutaneous tissues resulting in emaciation, marked stunting, and no oedema.
- Markedly retarded growth, psychomotor changes, and oedema of dependent parts are three essential clinical features of Kwashiorkor.
- PEM is usually associated with i) anaemia due to iron, protein, vitamin $B_{12,}$ or folic acid deficiency, ii) xerophthalmia due to vitamin A deficiency, and iii) other micronutrient deficiencies including magnesium, copper, zinc, vitamins B, C, D and K etc.

Assessment of nutritional status

Undernutrition is classified by WHO into moderate and severe forms as shown in Table 1. Reference values for weight for height are provided in Table 2.

Table 1: ***WHO Classification for severity of undernutrition***

	Moderate Undernutrition	Severe Undernutrition
Symmetrical oedema	No	Yes[a]
Weight for height	SD score[b] -2 to –3	SD score < -3

(measure of wasting)	(70-79% of expected[c])	(<70 % of expected)
Height for age	SD score[b] -2 to –3	SD score < -3
(measure of stunting)	(85-89% of expected[c])	(<85 % of expected)

a. This includes kwashiorkar and marasmic kwashiorkar.

b. SD score = $\frac{\text{Observed value – expected value}}{\text{Standard deviation of reference population}}$.

c. Median (50th percentile of NCHS standards).

Table 2: *NCHS/WHO Normalized reference values for weight-for-height/length*

Boys' weight (kg)			Length	Girls' weight (kg)		
-3SD	-2SD	Median	(cm)	Median	-2SD	-3SD
2.2	2.5	3.3	50	3.4	2.6	2.3
2.7	3.3	4.3	55	4.3	3.3	2.8
3.7	4.4	5.7	60	5.5	4.3	3.7
5.0	5.7	7.1	65	7.0	5.5	4.8
6.3	7.0	8.5	70	8.4	6.8	6.0
7.4	8.2	9.8	75	9.6	7.9	7.0
8.3	9.2	10.9	80	10.6	8.8	8.0
8.9	9.9	12.1	85	11.8	9.7	8.6
9.8	10.9	13.3	90	12.9	10.7	9.5
10.7	11.9	14.5	95	14.1	11.6	10.4
11.6	13.0	15.7	100	15.4	12.7	11.3
12.7	14.2	17.1	105	16.7	13.8	12.3
13.8	15.4	18.7	110	18.2	15.0	13.4

SD standard deviation score (or z score)

Indian Academy of Paediatrics (IAP) takes a weight of more than 80% of expected for age as normal. Grades of malnutrition are: Grade I (71-80%), Grade II (61-70%), Grade III (51-60%) and Grade IV (≤ 50%) weight of expected value for that age. Alphabet K is postfixed in the presence of oedema.

Treatment

Mild and moderate undernutrition

1. Mild and moderately under-nourished children are best treated in their own home surroundings. Domiciliary treatment of malnourished children by their mother is economical, offers in-built advantage of practical health education, and is associated with minimal recurrence risk.

Table 3. *Hospital management of severe malnutrition*

INITIAL TREATMENT: MANAGING COMPLICATIONS

Aim: Treat complications and stabilize the child

Problem	Management
Hypothermia (rectal temperature <35.5°C	• Keep under a heat source, such as radiant warmer, room heater, hot air blower or 200 W bulb, and warm upto rectal temp. 37.0°C within in 2-3 hours. • If electric gadgets are not available, cover the child well. Warm up with Kangaroo technique (placing the naked child on monthers' bare chest and covering them both together with cloth and blanket). • Monitor rectal temperature half hourly. • Investigate and treat for infection and hypoglycemia.
Hypoglycemia (blood sugar <54 mg/dl)	• 10% glucose, 5-10 ml/kg IV immediately followed by IV infusion of a dextrose containing solution. • Stop IV fluids as soon as blood glucose stabilizes and switch to oral feeds.
Dehydration (as assessed by WHO classification) Severe dehydration: weak pulse, oliguria	• Some dehydration is to be corrected with 2/3 diluted ORS over 12 hours. • Severe dehydration: Administer Ringer's lactate or N/2 5% saline 30 ml/kg 2 hours. If still pulse is not palpable, consider septic shock and manage accordingly. • If pulse improve after 2 hours, give N/6 5% saline @ 10 ml/k/gh in next 10 hours followed by 5 ml/kg/h in next 12 hours. • After dehydration is corrected, start on maintenance fluids @ 75-100 ml/kg/day till feeding is established. • Add potassium to IV fluids @ 30 mEq/L after the child passes urine.
Septic shock (clinical features similar to severe dehydration)	• Give blood/plasma transfusion 10 ml/kg over 3 hours. • Start antibiotics; as given in Infections • Fluid management is similar to that of severe dehydration.
Dyselectrolytemia	• There is a risk of hypernatremia and hypokalemia. • Restrict sodium intake and do not give hypertonic saline even in face of hypontremia. • Potassium supplements should be given @ 30-40 mEq/L per day of fluids provided if the child is passing urine freely.
Infections	• No apparent signs of infection and no complications: Cotrimoxazole (5 mg/kg of trimethoprim) twice daily for 5 days. • Presence of septic shock, hypoglycemia, hypothermia, skin, respiratory, urinary infection or sick looking: inj Ampicillin 50 mg/kg IM/IV 6 hourly + Gentamicin 7.5 mg/kg IM/IV once a day for seven days. • If no response to above antibiotics in 48 h; add Chloramphenicol 25 mg/kg IM/IV 7 hourly. Give every 6 hourly, if meningitis is suspected. • If specific infections are detected such as dysentery, malaria, pneumonia, worm infestations, tuberculosis, treat as per STG of that particular condition.
Congestive heart failure (tachycardia, cardiomegaly (Severe anaemia (haemoglobin < 4 g/dl)	• Restrict fluid intake • give Inj Frusemide 1 mg/kg stat. • If JVP is elevated, give a single dose of Inj Digoxin 5 mcg/kg • Give packed red cells 10 ml/kg in 4-6 h, carefully monitoring cardiac status.
Vitamin A deficiency	• Give a single dose of vitamin A orally to all children: < 6 months : 50,000 IU; 6 months - 1 year: 1,00,000 IU; > 1 year: 2,00,000 IU. • If signs of vitamin A deficiency are present, repeat the above dose twice; the next day and then after 2 weeks
Vitamin K deficiency or bleeding tendency	• Inj Vitamin K 2.5 mg IM single dose
Magnesium deficiency	• Give 20 ml of 50% solution of magnesium sulphate IV single dose
Folic acid deficiency	• Give folic acid 5 mg on day 1 followed by 1 mg/day.

INITIATION OF CURE: FIRST SEVEN DAYS **Aim:** Start Nutrition **Starting Point:** Once complications are taken care of and child is ready to tolerate feeds.	
Start feeding	• Initiate feeds as early as possible • If oral feeding is not possible, give nasogastric feeding. • Start with a lower volume of feed at frequent intervals; no. of feeds varying from 12 feeds on first and second day and 6 to 8 feeds on days 3-7. • if tolerated, milk based diets are most suitable (80 kcal/kg/d) and protein (0.7 g/kg/d). The caloric intake should not exceed 100 kcal/kg/d on the first day. Increased gradually over one week to 150 kcal/kg/day of energy and 2-3 g/kg/d of proteins. Total amount of fluids should be kept within 100-125 ml/kg/d. • Sugar and oil can be added to provide extra calories.
Lactose intolerance (stool pH, 5.5 on two separate occassions	• Reduce the total lactose load in the diet by diluting the milk for 3 or 4 days or substituting a part of milk feeds by formulae based on lactose free milk protein (calcium caseinate), sugar and oil, soyabean, meat or vegetable protein mixtures.
Other nutrients	• Supplement the diet with minerals and trace elements as follows: Potassium chloride (1.2-2.4 g/L of feed), magnesium chloride (300-600 mg/L of feed), zinc acetate (20 mg per day), copper acetate (2 mg/L of feed), selenium (6-10 mcg/kg/day) and folic acid (1 mg per day) • Do not give iron at this stage. Add iron only after a week of therapy. • Vitamins of B complex group are not useful in initial therapy.
Signs of improvement During these seven days, a child with kwashiorkor will lose weight and a marasmic child gains little or nothing because the tissue gains are masked by excess body water loss.	
Rehabilitative Phase (2-6 weeks) **Aim:** Restore normal weight for height. **Starting point:** Child has started showing signs of recovery of appetite and change of expressions.	
Intensive feeding (to recover lost weight	• Replace the initial milk diet with home diet as soon as possible. • Provide therapeutic diet as follows: fluids 150 ml/kg/day, energy 175-200 kcal/kg/day, protein g/kg/day. • The diet prescribed for the child should be such, which the family can afford to provide for the baby within its limited income, can be easily cooked at home, does not perish easily, is culturally acceptable and easily available in the local market.
Treat Concurent nutritional deficien-cies	• Start oral Iron 3mg/kg/d elemental iron once a day • Start other vitamins including vitamins B, C, D, E • Continue potassium, magnesium, zinc, copper, selenium and folic and supplementation • Provide vitamin D 400 IU oral once daily for 4 weeks

2. The parents are advised to increase the food intake of the child by all available means. The child should receive adequate amount of calories and protein in the diet, which should be prepared from the locally available, inexpensive foods.
3. The child should be kept under surveillance by using a growth chart and effort should be made that he does not slip down to severe malnutrition.

Severe malnutrition

Severely wasted children and those with oedema need hospitalization. Other indications for admission in an undernourished child are severe dehydration, severe diarrhoea, hypothermia, shock, systemic infection, jaundice, bleeding, age less than one year, or persistent loss of appetite. Those with severe stunting alone may be managed in the community. Hospital management of severe malnutrition is summarized in Table 3.

Refer, when child fails to i) regain appetite, ii) loose oedema, or iii) gain weight by day 10 of therapy. Children who fail to respond to treatment should be screened for faulty feeding, inadequate feeding, persistent diarrhoea, malabsorption, giardiasis, shigellosis, amoebiasis, otitis media, pneumonia, UTI, fungal infections, scabies, tuberculosis, helminthiasis, malaria, and HIV/AIDS. If the search proves futile, one should also look for any underlying immunological disease, inborn errors of metabolism and malignancies.

References

1. Protein Energy Malnutrition. In: Ghai's Essential Paediatrics, Ghai OP, Gupta P, Paul VK (eds), 5th Edition, 2000, New Delhi, Interprint, pp 65-77.
2. Management of Severe Malnutrition: A Manual for Physicians and Other Senior Health Workers,1999, WHO, Geneva.
3. Management of The Child With a Serious Infection or Severe Malnutrition, 2000, WHO, Geneva.

NUTRITIONAL RICKETS

Rickets is defective mineralization of growing skeleton caused by deficiency of vitamin D characterized by skeletal deformities like genu valgum/genu varum, broadening of wrists, susceptibility to fractures, weakness, hypotonia and disturbances in growth. Most often it is nutritional (lack of exposure to sunlight and inadequate dietary intake) and occurs between 2 months to 2 years of age. Radiological picture shows that epiphyseal growth plate is increased in thickness, cupped with hazy metaphyseal borders. Serum calcium is generally normal or low, phosphate is low or normal and alkaline phosphatase is raised in nutritional rickets.

Treatment

Nonpharmacological

Encourage the child to play outdoors/ increase exposure to sunlight.
Enhance dietary sources of vitamin D – dairy products, egg and fish liver oil.

Pharmacological

1. Vitamin D 600,000 IU Stat oral or IM (if patient is sick due to intercurrent infection)

Repeat X-ray wrist after 4 weeks. If the response is positive i.e.; healing line of rickets is seen on X-ray, continue Oral Vitamin D 400 IU/day.
If no response to therapy after 4 weeks refer to a higher centre for evaluation of non-nutritional rickets.

Patient education

- Exposure to sunlight is beneficial for a child with rickets
- No special type of oil is required for massage
- Consumption of dairy products which are rich in vitamin D should be emphasised.
- Most of the deformities improve in the due course of time.

References

1. Rickets. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 184-187.

PICA

This involves repeated and chronic ingestion of non-nutrient substances including mud, plaster, paint, earth, clay, etc. Most of the time, it is self-limiting and represents manifestations of family disorganization, poor supervision, and affectional neglect.

Treatment

- Pica below two years does not need any intervention.
- Children with pica are at increased risk of lead poisoning, iron deficiency,bezoars, and parasitic infections. They should be investigated for these problems and if present, treated suitably.
- Education, guidance and counseling of the family.
- The child has to be kept occupied in other tasks and provided with the environmental stimulation.

References

1. Vegetative Disorders. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 72.

BREATH HOLDING SPELLS

Paroxysmal self-limiting event occurring in upto 5% of healthy children and are rare prior to 6 months of age, peak at about 2 years of age and abate by 5 years of age.

Salient features

- Child starts crying (precipitated by an upsetting event, such as anger, fear, or injury) and then holds breath in expiration followed by a color change (blue or pale).
- Spell may resolve spontaneously or the child may lose consciousness. Normal breathing and alertness is resumed with in a minute.

Treatment

Reassurance: Explain that attacks are harmless and always abort by themselves.

Immediate measures

- Prevent injury during the episode. Help the child to floor and have him lie flat.
- If loss of consciousness occurs, place on the side to protect against aspiration.
- Maintain patent oral airway but do not start CPR.
- Do not shake the baby, splash water or put anything in the mouth.

Long term measures

- There are NO prophylactic medications. Treat iron deficiency, if associated

Refer to a higher centre

- If the child is less than 3 months or unconsciousness lasts for more than 1 minute.
- If attacks are too frequent or seizure disorder or cyanotic spell is suspected.

Parent education

- Avoid precipitating factors such as exhaustion, hunger, or injury. Do not give toys or tasks beyond the child's abilities and try to distract.

- Avoid excessive rules and restrictions. Try to remove unnecessary frustrations.

References

1. Breath Holding Spell. In: Essence of Office Practice, Stockman JA, Lohr JA. Philadelphia (eds), 2001, WB Saunders, pp 53.
2. Breath Holding Spell. In: Current Paediatric Diagnosis and Treatment, Hay WW, Hayward AR, Levin MJ et al (eds), 15th Edition, 2001, New York, Lange Medical Books, pp 80.
3. Breath Holding Spells, Paediatric Neurol,14, 1996, pp 91.

PRIMARY NOCTURNAL ENURESIS

Most common cause in primary enuresis is inappropriate toilet training. Other causes could be genetic, sleep disorder, reduced ADH at night. Psychological causes may be found in secondary. 3% children have organic pathology, such as obstructive uropathy or UTI.

Salient features

- Involuntary discharge of urine after the age at which bladder control should have been established (5 years).
- In primary nocturnal eneuresis child has never been dry at night while in secondary child has been continent for atleast for one year before the child begins to wet again.

Treatment

Nonpharmacological (effective in 30% cases)

- Rule out organic causes. Restrict fluid intake in the evening.
- Bladder exercises: i) hold urine as long as possible during the day. ii) practice repeated starting and stopping the stream at the toilet bowl.
- Practice getting up from bed and going to the bathroom at bedtime before sleep.

Pharmacological

Indicated only in children > 6 years where sufficient trial of nonpharmacological management has failed with following:

- Tab. Imipramine: 6-8 year (25 mg), 9-12 year (50 mg), >12 year (75 mg) once a day at bedtime. Success rate 30-60%, relapse rate 90%

Or

Desmopressin acetate (nasal spray, 10 mcg per spray): Start with 10 mcg given at bedtime daily and increase gradually by 10 mcg/per week to a maximum of 40 mcg per day. If effective, it should be used

for 3-6 months. Success rate is 40-60%, relapse rate 90%.

Or

Tab. Desmopressin 0.1-0.5 mg at bedtime.

Refer the patient to a higher centre if organic cause is suspected or when diagnosis is in doubt.

Parent education

- Reassure the parents that condition is self-limiting.
- Ask the parents to maintain a diary record of dry nights; reward the child for such nights. Avoid punitive measures.

References

1. Current Paediatric Diagnosis and Treatment. Hay WW, Hayward AR, Levin MJ,et al (eds), 15th Edition, 2001, Lange Medical Books, New York, pp 175-176.
2. Nocturnal Enuresis. In: Evidence Based Paediatrics and Child Health, Meyer VA, Elliott EJ, Davis RL, et al (eds), 2000, BMJ Books, London, pp 313-317.
3. Enuresis. In: Essence of Office Practice, Stockman JA, Lohr JA (eds), 2001, WB Saunders , Philadelphia, pp 127.

ACUTE BRONCHIOLITIS

Acute bronchiolitis is an acute respiratory tract infection caused commonly by viral pathogens. The commonest etiological agent being respiratory syncytial virus. Bronchiolitis commonly occurs in infants below 6 months of age.

Salient features

- Cold for 2-4 days followed by cough, wheeze and rapid respiration. With increasing severity of illness there may be lower chest indrawing, difficulty in feeding, excessive crying due to hypoxaemia, cyanosis and respiratory failure. There may be history of viral upper respiratory infections in other family members in the recent past.
- Mild disease is characterized by rapid respiration, no chest indrawing, no problem in feeding, no clinical evidence of hypoxaemia and oxygen saturation is more than 95% (optional).
- Severe disease is characterized by chest indrawing, difficulty in feeding, clinical evidence of hypoxaemia, lethargy, convulsion, oxygen saturation <95% (optional).
- Normal or minimal increase in total leucocyte counts with relative lymphocytosis. X-ray chest may show hyperinflation and small atelectasis.

Treatment

Nonpharmacological

- For associated nasal block normal saline drops in both nostrils as and when required, specially before feeds, and use of home remedies (ginger, honey, tulsi) for control of cough and plenty of liquids orally.
- For hospitalised patients elevation at 30-40 degree and neck slightly extended.
- To be nursed in comfortable environment.

Pharmacological

Treatment of mild disease (Ambulatory treatment at home)

No antibiotics.

Syp. Paracetamol 10-15 mg/kg 4-6 hourly for fever (for details see section on fever).

If patient shows overall improvement with no evidence of chest indrawing, cyanosis, difficulty in feeding continue treatment as above. If there is partial improvement patient should be called again after 2 days or earlier if patient deteriorates for reassessment.

Hospitalize immediately if any of the following develop:

Chest indrawing, poor feeding, cyanosis, altered sensorium and convulsions and managed as severe disease.

If there is no improvement or deterioration at any time during the illness, the patient should be managed as severe disease.

Treatment of the severe disease (Needs hospitalization for management)

1. Oxygen administration by oxygen hood or nasal catheter and intravenous fluids if child is not able to feed.
2. Adrenaline inhalation (Injectable form) 0.3 mg/kg by nebulizer after dissolving the solution in 3 ml saline; can be repeated every 4-6 hourly as required.
   (No role of antibiotics, steroids, ribavirine inhalation in uncomplicated patients).
3. If adrenaline not available Salbutamol inhalation (0.15 mg/kg dissolved in 3 ml soln) may be tried and continued if response observed.
4. Syp. Paracetamol 10-15 mg/kg/dose may be given 4-6 hourly.
5. Do not use sedatives.

Monitor improvement in respiratory rate, lower chest indrawing, difficulty in feeding, excessive crying, cyanosis and oxygen saturation, if available, every 4-6 hours till there is significant improvement. If does not improve/ deteriorate look for underlying heart disease i.e., myocarditis/congenital heart disease and get an X-ray chest and look for massive collapse of lung/infection/pneumothorax etc. and manage accordingly.

Patient education

- Mother should be educated about the signs of pneumonia i.e., rapid respiratory rate, chest indrawing, difficulty in feeding.
- Mother should be educated about identification of danger signals in a child suffering from pneumonia and report immediately to the health care facility.

References

1. Bronchodilators for Bronchiolitis, 2, CD001266, 2000 Cochrane Database Syst Rev.
2. Prednisolone Treatment of Respiratory Syncytial Virus Infection: A Randomized Controlled Trial of 147 infants. Paediatrics, 1999, pp 104, 77.
3. Randomized Placebo-Controlled Trial of Nebulized Corticosteroids in Acute Respiratory Syncytial Virus Bronchiolitis. J Accid Emerg Med,17, 2000, pp 369.
4. Ventilated Respiratory Syncytial Virus Bronchiolitis. A Randomized Placebo Controlled Trial. Am J Respir Crit Care Med, 1999, 160, pp 829-34.

PNEUMONIA

Pneumonia is commonly caused by infectious agents e.g. viruses, bacteria and mycoplasma. Viruses alone or combined with bacteria are responsible for majority of the cases. In developing countries bacterial pneumonia (*Streptococcus pneumoniae, H. influenzae*) may be more common.

Salient features

- Fever, cough with rapid breathing, lower chest indrawing, crepitations/wheezing, difficulty in feeding and cyanosis.
- On the basis of clinical features pneumonia can be classified as mild to very severe disease.

  No pneumonia - no fast breathing and no indicators of severe or very severe pneumonia.

  Pneumonia - fast breathing e.g. age below 2 months $\geq$ 60 RR/min; 2 months - 12 months $\geq$ 50 RR/min; 12 months - 60 months $\geq$ 40 RR/min and no indicators of severe or very severe pneumonia.

  Severe pneumonia - lower chest indrawing or nasal flaring and no signs of very severe pneumonia.

  Very severe pneumonia - central cyanosis or not able to breastfeed or drink or convulsions or lethargy or unconsciousness or severe respiratory distress (e.g. head nodding).

Treatment

Nonpharmacological

- Nasal block to be treated with saline nasal drops as and when required, especially before feeds.
- Ginger, honey, tulsi with warm beverages can be used as home remedies for cough.
- Patients with respiratory distress to be nursed in semi reclined posture at angle of about 30°.
- Young infants should be nursed in comfortable position preferably in mother's lap.
- Breast feeding and small frequent feeds to be continued in children who do not have severe or very severe pneumonia.

Pharmacological

Fever to be treated as in section on fever.

Treatment is initiated according to the severity.

a) Pneumonia

Patients with age more than 2 months and with absence of features of severe/very severe pneumonia can be treated at home.

Tab./Syp. Amoxycillin 20-40 mg/kg/day in 3 divided doses for 5-7 days.

Or

Tab./Syp. Cephalexin 20-40 mg/kg/day in 3 divided doses for 5-7 days.

Or

Tab./Syp. Cotrimoxazole (TMP) 6-8 mg/kg/day in 2 divided doses for 5-7 days.

b) Severe pneumonia and very severe pneumonia age <2 months

Patient should be hospitalized

1. Oxygen inhalation 4 L/min
2. IV fluids to maintain normal hydration.

Inj. Cefotaxime 100 mg/kg/day in 3 divided doses for 7-10 days.

Or

Inj. Cefuroxime 100 mg/kg/day in 2 divided dose for 7-10 days

Or

Inj. Ampicillin 100 mg/kg/day in 3 divided doses

Plus

Inj. Gentamicin 7.5 mg/kg/day in 2-3 divided doses for 7-10 days.

c) Severe pneumonia and very severe pneumonia with age >2 months

Inj. Chloramphenical 100 mg/kg/day in 3-4 divided doses for 7-10 days.

Or

Inj. Ampicillin 100 mg/kg/day in 3-4 divided doses for 7-10 days. (preferred in children >3 years)

High risk patients in category (c) i.e. post measles, with congenital heart disease and severe malnutrition etc may be given Amoxycillin + Clavulanic acid, Cefotaxime/Cefuraxime as initial therapy.

Children who deteriorate rapidly, develop empyema/pneumothorax or have skin lesions suggestive of Staphylococcal infection - should be treated with Inj. Cloxacillin 200 mg/kg/day in 3-4 divided doses + Inj. Gentamicin 7.5 mg/kg/day in 2-3 divided doses.

Follow up and monitoring

Children with mild pneumonia are reassessed at 48 hours or earlier if child deteriorates. If child shows improvement same treatment is continued for 5-7 days. If deteriorates patient is hospitalised and treated as severe/ very severe pneumonia. Children who are hospitalised (severe and very severe pneumonia) are monitored more frequently. Children with severe/ very severe pneumonia (age >2 months) on deterioration can be treated with cefotaxime/cefuroxime in the doses given in (b).

Patient /Parent education

- Explain the signs of pneumonia i.e., rapid respiratory rate, chest indrawing, difficulty in feeding etc.
- Explain the danger signals in a child suffering from pneumonia.

References

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WHEEZY CHILD

Wheezing is a clinical symptom present in asthma and other illnesses including bronchiolitis and other viral infection, foreign body inhalation, tuberculosis, pneumonia, cystic fibrosis, immune deficiency, bronchomalacia, hypersensitivity pneumonia and conditions compressing airways. Wheezing during infancy could be due to viral infections. Absence of family history

and personal history of atopy with gradual decrease in frequency of episodes is seen in many transient wheezers who grow out of their wheezing episodes.

Wheezing in asthma is recurrent, gets worse in night and after exercise, seasonal and may be associated with other allergic illnesses like atopic dermatitis, allergic rhinitis etc. Clinical features suggestive of other cause of wheezing are: neonatal onset, associated with difficulty in feeding, choking or vomiting, localized findings in chest or abnormality in cardiovascular system.

ASTHMA

Salient features

- Classic triad of cough, wheeze, breathlessness. However all the three may not be present. The patient may have tachypnoea, rhonchi and varying degree of dyspnoea.
- Clinical symptoms may be increased due to upper respiratory viral infections, exercise, exposure to smoke, dust, cold air, cold food or various allergens. Peak expiratory flow rate (PEFR) and FEV1 is decreased and show increase of more than 15% after beta agonist inhalation.
- Blood test may show increase in absolute eosinophil count. X-ray chest may be normal or may show increased bronchovascular markings.
- Severity of acute asthma can be assessed and classified as mild, moderate to severe or life threatening on the basis of following: respiratory rate, chest indrawing, difficulty in speech, feeding, cyanosis, pulsus paradoxus, oxygen saturation and PEFR or FEV1.

Mild acute asthma is characterized by: cough with or without wheeze, some difficulty in respiration but no problems of speech or feeding. Oxygen saturation of more than 95% and PEFR of more than 80% predicted.

Moderate to severe asthma is characterized by: tachypnoea, tachycardia, mild chest indrawing, difficulty in feeding and speech. Oxygen saturation may be as low as 90% and PEFR is 30-60% in severe asthma.

Life threatening asthma is characterized by: poor respiratory effort, cyanosis, exhaustion, agitated or depressed, oxygen saturation may be as low as 90% and PEFR is less than 30% in severe asthma predicted.

Treatment

Nonpharmacological

Encourage parents to identify precipitating factors and try to avoid them.

Pharmacological

Mild Acute Exacerbation of Asthma

Inhaled Salbutamol or Terbutaline 1-2 puffs by metered dose inhaler with spacer with or without baby mask. It can be repeated every 2-4 minute up to a total of 10 puffs.

Assess the child after 30 minutes.

Good response is defined as child feeling well with minimal or no dyspnoea, marked improvement in heart rate, respiratory rate and little or no rhonchi on auscultation with oxygen saturation above 95%. Children showing good response may be sent home on inhaled or oral bronchodilators for 7-10 days.

If patient is on maintenance treatment with high dose inhaled steroids or attended emergency room in last 72 hours add. Tab. Prednisolone 1 mg/kg/day for 3-5 days. If patient is already on low dose maintenance inhaled steroids; double the inhaled steroids for 7-10 days. Call the patient again for reassessment after 1-2 weeks or early if symptoms are not getting controlled or worsening.

Children not showing good response should be treated as moderate to severe acute asthma.

Moderate to Severe Acute Asthma

1. Oxygen inhalation at a rate of 4 L/minute by oxygen hood/nasal catheter/face mask.
2. Inhaled Salbutamol/Terbutaline by MDI with spacer with/without face mask 1-2 puffs ever 2-4 minutes up to 10 puffs and repeat every 20-30 minutes.

   Or

   Nebulized Salbutamol 0.15 mg/kg in 3 ml saline every 20-30 minutes.

   Or

   Inj. Terbutaline 10 mg/kg SC or Inj. Adrenaline (1:1000) 0.01 ml/kg SC (upto 0.03 ml) every 20-30 minutes with a total of 2-3 doses.
3. Tab. Prednisolone 1 mg/kg stat.

Assess the child after 60-90 minutes.

Good response: continue inhaled salbutamol/ terbutaline every 2-4 hours and gradually decrease the frequency of administration with monitoring. The patient can be sent home when shows good response, not requiring oxygen inhalation, not having difficulty in speech or feeding and getting inhaled medication 4-6 hourly. The child can be sent home on inhaled Salbutamol/Terbutaline, oral Prednisolone for 3-5 days and call after 5-7 days for reassessment.

Incomplete or poor response: admit the patient in ward if facility exist or refer to a higher hospital

1. Continue oxygen inhalation as above.
2. Continue Salbutamol inhalation every 20-30 minutes as above.
3. Add Ipratropium inhalation 250 mcg with Salbutamol every 20-30 minutes.
4. Give another dose of oral Prednisolone.

Get an X-ray chest and rule out infection, pneumothorax or collapse of segments or lobes of lung and manage accordingly. Do arterial blood gas analysis and serum electrolytes for detection of acidosis and hypokalaemia and manage accordingly and reassess after 60 minutes.

Good response: continue oxygen, Beta agonists, Ipratropium and oral Steroids for 5-7 days. Decrease the frequency of Salbutamol inhalation, stop oxygen inhalation by monitoring the patient's clinical features and oxygen saturation. Discharge the patient when there is no respiratory distress, not requiring oxygen inhalation and getting salbutamol 4-6 hourly. Call the patient for reassessment after 5-7 days for consideration of maintenance treatment.

Poor response: Inj. Theophylline 5 mg/kg diluted slow infusion and than 0.8-1.2 mg/kg/hr as infusion. Inj. Magnesium sulphate 50 mg/kg in 50 ml 5% dextrose over 30 minutes may also be given at this stage. Continue as above

Reassess if good response: Continue Salbutamol and Ipratropium inhalation, Prednisolone, and Beta agonists. Reduce frequency of inhaled medication with monitoring. Discharge the patient when completely well, on inhaled Salbutamol, oral Steroids and call after 5-7 days for reassessment.

Poor response: Transfer to a paediatric intensive care unit if facility exists or refer to a higher center.

Life Threatening Asthma

1. Oxygen inhalation 4 L/min to maintain SpO_2 >90%.
2. Inj. Terbutaline 10 mcg/kg subcutaneously or IV.
3. Inhaled Salbutamol/Terbutaline preferably by nebulizer (as discussed above).
4. Ipratropium Bromide 250 mcg by nebulizer with Salbutamol.
5. Inj. Hydrocortisone 10 mg/kg IV.
6. Inj. Aminophylline 5 mg/kg bolus slowly followed by 0.8-1.2 mg/kg/hour slow infusion (If patient has received theophylline preparation in last 72 hours; reduce bolus dose to 2.5 mg/kg).
7. Inj. Magnesium sulphate 50 mg/kg in 50 ml 5% dextrose as slow infusion over 30 minutes.

If no response do arterial blood gas analysis, X-ray chest and serum electrolytes. Intubate the child if no or poor respiratory effort, increased carbon dioxide with respiratory acidosis. Transfer to paediatric Intensive care unit as early as possible.

If above therapy fails. Transfer should be arranged so that oxygen and inhalation therapy can be continued on the way.

Note:

- Antibiotics are required only if there is a consolidation, high grade fever or polymorphonuclear leucocytosis.
- Mucolytics and cough syrups are not helpful.
- Sedation should be avoided in acute asthma.
- Newer antihistaminics may be used if associated allergic rhinitis is there.

Long-term management of asthma

Assess severity of asthma on the basis of the frequency of symptoms including disturbance of sleep, effect on day-to-day activity of child and need for medication, hospital visit and hospitalization and pulmonary function tests (PFTs) by spirometer (Table 1).

Note:

- Doses prescribed in Table 2 are for Budenoside and Beclomethasone, if Fluticasone is used at only half of the prescribed dose may be necessary.
- In a patient with symptomatic moderate to severe disease begin with a higher dose. It is preferrable to add long acting bronchodilator (Salmeterol, Formetarol) initially because of quicker symptomatic relief and steroid sparing effect.

Select an appropriate inhalation device

- Children below 4 years of age: Metered dose inhaler (MDI) with spacer with facemask
- For children above 4 years of age: MDI with spacer
- For children above 12 years of age MDI may be used directly. However use of spacer improves drug deposition in airways.

Follow up and modification in treatment

Call the patient every 8-12 weeks. On each visit examine the child, look for adverse effects of the drugs and record height and weight. Measure PEFR/PFTs in older children and record the assessed status of disease. Step down the medications if control is sustained for at least 3 months and follow a gradual stepwise reduction in treatment (Table 2).

If there is no improvement or deterioration, look for possible cause such as poor compliance, wrong technique of inhalation, continued use of empty canister, inappropriate doses, infection (otitis media, sinusitis, pneumonitis), continued exposure to allergens, under assessment of

Table 1: *Assessment of severity of asthma*

	Symptoms	Night time symptoms	PEFR
Step 4 Severe persistent	Continuous Limited physical activity	Frequent	≤ 60% predicted Variability > 30%
Step 3 Moderate persistent	Daily use beta 2 agonist daily attack affect activity	> 1 times a week	>60%<80% predicted variability>30%
Step 2 mild persistent	> 1 time a week but < 1 time a day	>2 times a month	≥ 80% predicted variability 20-30%
Step 1 intermitent	< 1 time a week Asymptomatic and normal PEFR between attack	≤ 2 times a month	≥80 predicted variability <20%

Table 2. *Selection of drugs for asthma*

	Long term prevention
Step 4 Severe persistent	Inhaled short acting beta 2 agonist as required and inhaled corticosteroids, 400 mcg twice daily may increase up to 2000 mcg/day in selected cases
	Long acting bronchodilator either long acting inhaled beta 2 agonist and/ or sustained release theophylline
	Theophylline and/ or long acting beta 2 agonist tablets Corticosteroid tablets low dose alternate day if no relief with above treatment
Step 3 Moderate persistent	Inhaled short acting beta 2 agonist as required and Inhaled Corticosteroids, 400-800 mcg divided twice daily If needed long acting bronchodilator: either long acting inhaled beta 2 agonist salmeterol 50 mcg twice daily and/or sustained release theophyline
Step 2 Mild persistent	Cromoglycate or sustained release theophylline.
Step 1 Mild intermittent	Inhaled short acting beta 2 agonist as required for symptoms relief. If they are needed more than 3 times a week move to step 2. Before altering step ensure patient is taking the treatment and technique is correct.

illness in previous visit, allergic rhinitis and sinusitis. If no cause is found a step up may be considered i.e., increase in dose and frequency of medication.

Home treatment of acute exacerbation

1. Identify acute exacerbation by increase in cough, wheeze and breathlessness.
2. Measure PEFR (if feasible) if decreased by 15% from the baseline.

Administer Salbutamol by MDI with spacer with or without face mask, one puff at a time, repeated every 2-4 minutes up to a maximum of 10-20 puffs with monitoring of symptoms.

If symptoms are relieved and PEFR is increased at the end of inhalation, the child can be continued on Salbutamol/Terbutaline every 4-6 hours and a visit to treating physician should be planned.

If there is no improvement or partial improvement or there are symptoms of life threatening attack (severe distress, difficulty in speech, feeding, cyanosis, exhaustion) at any time, the child should be immediately transferred to a hospital and during transportation continue inhaled Salbutamol/Terbutaline and give a dose of prednisolone (1-2 mg/kg).

Patient/parent education

- Explain the nature and pathogenesis of asthma in simple language
- Emphasize that there is a wide spectrum of severity of asthma and that most children can lead active and normal life
- Ask to maintain a record of daily symptoms such as cough, coryza, wheeze and breathlessness. A record of sleep disturbances, absence from school due to illness and medication required to keep the child symptom free is advised.
- Environmental control to avoid precipitating factors is equally important.
- Parents should avoid dusting (wet mopping is preferred) when children are around.
- Avoid using carpets, stuffed toys, open bookshelves, smoking and chemical sprays in the house. Mosquito nets should be preferred over repellents.
- Food with chemicals like preservatives/colouring agents should be avoided.
- Inhalation technique: It is best to use MDI with spacers, however, if low dose steroids are being given then dry powder inhaler can also be used. MDI must be shaken well before inhalation. It is then attached to spacer (commercial/indiginous made from plastic bottle) and child is asked to inhale 3-4 times slowly and deeply just when the drug is released by activation of MDI.

- Parents must be advised to check the cannister every few days dipping it in a tumbler full of water. An empty cannister floats.

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THRUSH (ORAL CANDIDIASIS)

Oral candidiasis may be seen as early as 7-10 days of age (peak 4th week of life) uncommon after 12 months of age, when it is secondary to broad-spectrum antibiotic treatment. Chronic/recurrent oral candidiasis is seen in hypoparathyroidism, Addison's disease, autoimmune disorders, immuno defeciency, AIDS, myelosuppresive therapy and severe malnutrition.

Salient features

- Thick white patches on an erythematous base in the oral mucosa, may spread to involve the lips, buccal mucosa, tongue and palate.
- Asymptomatic or may cause pain in the mouth, discomfort, anorexia and decreased feeding. Rarely may cause aspiration pneumonia.
- Diagnosis is confirmed by the fact that on removing the plaques punctate areas of bleeding are seen on the undersurface.

Treatment

Nonpharmacological

Correction of faulty sterilization technique of bottle.

Pharmacological

Nystatin (100,000 units/ml) oral suspension 1 ml delivered to each side of mouth every 6 hours.

Or

Clotrimazole 1% cream, gel or lotion, oral application 3-4 times/day after feeding for 5-7days (or 1-2 days beyond recovery).

Or

Miconozol gel 25 mg 4 times a day for 5-7 days.

Or

Gentian violet 1% aqueous solution 1-2 times a day, for 5-7 days. (can stain tissues and clothes)

In resistant/chronic cases (patients with major underlying disease)

Tab. Fluconazole 3-6 mg/kg once daily for 5-7 days.

Or

Tab. Ketoconazole 3-6 mg/kg once daily for 5-7 days.

Warning

Resistant/recurrent/chronic thrush in a child with no obvious predisposing factor/source of infection look for underlying endocrinopathy/immune disorder, AIDS and malnutrition.

Patient/Parent education

- Emphasize on bottle hygiene, care/hygiene of the nipple and treatment of vaginal candidiasis in expectant mother.

References

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CONSTIPATION

Constipation is defined as the passage of hard stools that are difficult to pass irrespective of frequency. However, passage of stool less than twice a week is considered as constipation. Genuine hard stools may result from an inadequate milk intake, hunger stools, use of over-strength artificial feeds and low roughage diet. True constipation may be due to imperforate anus, meconium plug, low intestinal obstruction, neonatal small colon syndrome, Hirschsprung's disease, cystic fibrosis or hypothyroidism but most of the times it is idiopathic.

Salient features

- Fretfulness, poor appetite, intermittent abdominal pain, distension. Retentive posturing occurs with urge to defecate, relieved after going to the toilet, overflow soilage may appear.

There may be history of recurrent UTI. Weight gain may be k, impaired.

- On examination there is faecal soiling of under wear and persistent faecal odour. Abdomen is often distended and tympanic to percussion. Faecal masses palpable above pubis and in left colon, rarely entire colon is filled with firm mass on rectal examination, hard stool is palpable in ampulla.

Treatment

If a surgical cause is suspected patient should be investigated and treated accordingly.

The main objective of medical management are to dislodge faecal mass, overcome withholding behaviour and promote regular bowel habits.

Nonpharmacological

- Dietary modification: Ensure adequate fluid intake in diet. In infants, breast milk should continue as it is less likely to be constipating than cow's milk, can add extra sugar in cow's milk if child is not breast-fed. Add fibre by cereals (wheat bran, oat, corn), pulses, vegetables, salads and fruits and isabgol.
- Behavioural modification
  - Toilet training to achieve regular evacuation. Child is instructed to use bathroom after break fast or dinner, to take advantage of meal stimulated increase in colonic motility.
  - Maintain calendar to record stooling.
  - Positive reinforcement (reward/appreciation) for successful toileting (no punishment for failure)

Follow up with regular contact with child and patient for 2-3 years.

Pharmacological

1. Agarol or Lactulose in infants 2.5-10 ml/day; children 40-90 ml/day in in 3-4 divided doses.

   Or

   Mineral oil (Liquid paraffin) 5-15 ml/kg/day

   Or

   Milk of Magnesia 0.5-3 ml/kg/day. Dose is titrated to produce at least one stool/day.

   Medical management has to be with different group of laxatives added serially to maximal doses and maintained for a considerable length of time (3-6 months) and then tapered gradually. Commonest cause of failure is short term treatment and suboptimal doses.

2. Enemas may be used in severe cases where sufficient trial of medical therapy has failed

Hypertonic Phosphate (5-6 ml/kg) or Glycerine saline (1 ml/kg). Pure saline enemas are less effective and plain tap water/soap water enemas are not used in children. Suppositories of Glycerine/Bisacodyl may also be used. To empty the bowel of faecoliths, enemas may be required daily or alternate day for initial few days.

In severe cases with faecal soiling, in the initial stages: bowel cleaning/ disimpaction may be required with enemas 1-2/day or suppositories 1-2/day.

In very severe cases with multiple faecoliths, failed medical treatment, mental retardation etc., surgical disimpaction may be done.

Patient/Parent education

- The parents should be empowered to titrate the medication against the child's stools.
- Importance of dietary modifications should be explained.
- Treatment should not be abandoned early after recovery.
- Bowel training should have only positive reinforcements. Negative reinforcement should be avoided at all costs.

References

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RECURRENT ABDOMINAL PAIN OF CHILDHOOD (RAP)

Three or more bouts of abdominal pain occurring over a period of not less than three month and severe enough to interfere with child's normal activities. It is most common in the age group of 5-15 years and in 90% cases it is functional.

Salient features

- Paroxysmal - Child appears well in between the episodes or sometimes dull continuous ache may be present.
- Mostly periumblical, epigastric or suprapubic.
- Episodes last for generally less than one hour.
- Not related temporally to activity, meals, stress or bowel habits.
- Rarely awakened from sleep
- Normal physical examination and growth.

Warning signs pointing towards organic pain

- Well localized pain away from midline (Apleys law - farther the pain from midline, more likely to be organic).
- Repeated vomiting
- Pain awakening the patient from sleep.
- Radiation to shoulder, back, scapula, lower extremities.
- Age less than 2 years
- Associated fever, arthralgias, rash, rectal bleeding.
- Consistent sleepiness following pain attacks.
- Intermittent faecal incontinence
- Weight loss or growth deceleration
- Recurrent isolated episodes of pain that come on suddenly and last for several minutes to few days.
- In case of any warning sign patients should be investigated accordingly, otherwise treat as functional. However, basic investigations e.g. urine, stool, Montoux and ultrasound examination might be done. Upper gastrointestinal endoscopy is generally not required.

Treatment

Nonpharmacological

- Treat organic cause if found.
- Environmental intervention to avoid painful stress, change in parent reaction to avoid secondary gain. Common psychogenic factors responsible for RAP are complaint modelling (parents with abdominal pain), school phobia, learning problems, anxious over achiever, ridicule by peers, teacher incompatibility, attention seeking (attention withdrawal after an illness, over busy parents, single child, sibling rivalry, eating time conflict, forceful toilet training), family psychopathology (parental conflict, single parent).
- Visit to doctor and placebos often help
- Child is asked to maintain pain chart (help in assessment of improvement as well as etiology).

- If required, help from a psychologist may be taken.

Pharmacological

- Nothing more than placebo are required.
- Constipation, if present may be treated.

Patient/parent education

- Explain the outline of the work up and treatment for the child before starting treatment. Doing so after negative work up makes family feel that the physician is making excuses. Explain that cause of RAP in most children is nonorganic.
- Discovery of cause may lessen the family's concern but may not alleviate the symptoms. There is no way to be certain that abdominal pain is because of identified disease entity. Pain may continue and its persistance does not mean serious organic disease.

References

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TYPHOID OR ENTERIC FEVER

Salmonella typhi causes a variety of illnesses including asymptomatic carriage, gastroenteritis, enteric fever etc.

Salient features

- The onset of fever is typically gradual with constitutional symptoms like malaise, anorexia, lethargy etc. which may be associated with abdominal pain and tenderness, hepatomegaly, splenomegaly, and/ or change in mentation. Usually the patient is sick and toxic looking with a coated tongue and has a soft splenomegaly.
- Complications like hepatitis, peritonitis, meningitis, pneumonitis, myocarditis can occur, usually after the first week.

Treatment

Pharmacological

- Management of fever (see section on fever)

- Antipyretics can cause precipitous fall in temperature and even shock, in enteric fever. They should be used judiciously. Therefore, hydro therapy is preferred for fever management in such patients.
- Adequate nutrition and hydration should be maintained ensuring adequate intake either orally or with Intravenous fluids (in severely ill)
- In-patient treatment is recommended if the patient is very sick, not accepting orally with inadequate urine output, has altered sensorium/ drowsiness or is having very high pyrexia particularly in the second week of illness when the risk of complications increases or if the complications have already ensued.

Pharmacological

Specific therapy: Multi drug resistance is prevalent among *S. typhi.* So the antibiotics are recommended on the basis of available resistant pattern or epidemiological data and sensitivity pattern is as below:

1. Inj. Ciprofloxacin 15-20 mg/kg/ day in 2 divided doses given as IV infusion/Oral. Oral drug should be taken about an hour after meals and not empty stomach or with meals.

   Or

   Inj./Tab. Oflaxacin 5-8 mg/kg/day in 2 divided doses given as IV infusion or oral

   Or

   Tab. Cefixime 10-20 mg/kg/day in 2 divided doses

   Or

   Inj. Ceftriaxone 75-100 mg/kg/day IV in 2 divided doses
2. In patients with shock, obtundation, stupor or coma short course of dexamethasone may be used

   Inj. Dexamethasone 2 mg/kg initial dose followed by 4 mg/kg every 6 hours for 48 hours

The usual duration of antibiotic treatment is 10-14 days or atleast 7 days after the patient has become afebrile. Intravenous therapy is used during acute phase among the admitted patients. Less sick patients can be treated with oral drugs on an outpatient basis.

Assessment of response to therapy

- The toxic look of the patient decreases and appetite starts returning in 72-96 hours of treatment and gradually the fever also starts responding, touches the baseline for increasing duration. The fever can take as long as 7 days to respond.
- Some times the patient may apparently appear to have responded whereas patient may be developing impending shock due to complications. So a careful clinical assessment should be done particularly if there is a precipitous fall in temperature.

Modification or step up therapy if required

- The patient should be monitored for complications and usual indications for inpatient treatment are: myocarditis (fall in perfusion and BP, arrhythmias), altered sensorium, shock (tachycardia, cold clammy skin, diaphoresis, hypotension), perforation peritonitis (acute pain in abdomen, guarding, rigidity, hypotension, billious vomiting).
- In case the patient worsens or fails to show any response to therapy in 4 –7 days or so, as discussed above, then a change of antibiotics is suggested, preferably on the basis of the culture sensitivity report, where available.

Patient/parent education

- Small frequent feeds should continue. Give plenty of oral fluids and compensate for increased fluid loss from the body due to high grade fever.
- Fever usually lasts 5-7 days even after starting effective treatment in most cases. Frequent change of therapy should therefore be avoided.
- The treatment should be completed till the patient has been afebrile for atleast 7 days as incomplete treatment increases the risk of relapse and emergence of resistance.
- The caregivers of the patients should be informed about the complications as described above.
- Ciprofloxacin and Ofloxacin are very bitter and cause severe nausea and gastritis. Patient should be asked to report any missed doses due to vomiting.
- Three types of vaccines are available to prevent this disease (see section on immunization and appendix IX and X for details).

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ACUTE DIARRHOEA

Acute diarrhoea is defined as increase in frequency, fluidity or volume of stools. It is caused commonly by *Rotavirus*, *E. coli, V. cholera, Giardia* or parenteral infections and invasive diarrhoea by *Shigella, Salmonella* and *E. histolytica.*

Salient features

- Clinical features of diarrhoea are frequent stools, vomiting, fever and dehydration
- Dehydration is categorized into some dehydration and severe dehydration.
  In **some dehydration**: child is thirsty and drinks voraciously, active and alert but irritable, with sunken eyes, depressed fontanelle, absent tears, loss of skin turgor and some decrease in urine output.
  In **severe dehydration** all these are more severe except that child is lethargic and does not want to drink water.

Following investigations may be done if indication exists:

Investigations	Indications
Stool microscopy	Dehydration or high fever, Diarrhoea persisting beyond 7 days, Blood persisting in stool after 48 hour of treatment.
Blood urea S. electrolytes (SE) and arterial blood gas (ABG)	All 3 investigations in moderate to severe dehydration, SE in persistent vomiting or signs of dyselectrolytaemia ABG in respiratory distress and no chest signs and sepsis (correct it only if pH <7.25).
Infection screening by TLC, DLC, band cell count, ESR and CRP	Fever persisting >72 hours, PEM > grade III or age <3 months.
Blood culture Chest X-ray, CSF and others Stool culture	Suspected sepsis, Before starting antibiotics. As and when required No role

Treatment

Nonpharmacological

- Maintain hydration by home available fluids in place of or along with ORS. These are rice, kanji, butter milk, dal soup, coconut water or weak tea etc.

- Maintain nutrition: continue breast feeding. Continue normal light diet e.g. khichri, dalia, banana or mashed dal etc. Do not dilute or stop milk as there is not much role of lactose intolerance or milk protein allergy. Give extra food during recovery.

Pharmacological

1. Oral rehydration solution (ORS) is used in some dehydration
   - 75 ml/kg in 4 hours under observation.
   - After 4 hours if dehydration is corrected, or if child was not dehydrated at presentation, send home with instructions to give ORS in 2:1 dilution as accepted by the child. Asked to report back if vomiting persists or urine is not passed for >8 hours. As a rough guideline 10 ml/kg of ORS may be added for each large stool.
   - If dehydration is not corrected after 4 hours, same amount of ORS may be repeated in next 4 hours and if dehydration is corrected send home.
   - If dehydration does not improve in 8 hours or if it worsens abandon oral rehydration therapy (ORT) and give IV fluids.

   Principles of ORT
   - Give in small sips.
   - Vomiting is not a contraindication unless persistent.
   - Contraindicated in altered sensorium or paralytic ileus.
   - Stop as soon as diarrhoea stops
2. IV fluid therapy in case of severe dehydration or shock or contraindications or failure of ORT.

N/2 saline is given over 8 hours (1:100 ml KCl after child passes urine), as follows:

- Some dehydration- 75 ml/kg.
- Severe dehydration- 150 ml/kg (half in first 2-3 hours)
- Shock- push 20 ml/kg of Ringer's lactate or normal saline over 15 minutes and can repeat twice more if shock persists use central venous pressure monitoring for further management if shock present after pushing 60 ml/kg.

Specific therapy with following, if indicated:

Frank blood and mucus in the stool or >10 pus cells/HPF

Syp. Nalidixic acid 55 mg/kg/day in 3 divided doses for 5 days

Or

Syp. Ciprofloxacin 15-20 mg/kg/day in 2 divided doses (Shigella strains are largely resistant to ampicillin and cotrimoxazole)

Giardiasis (only if trophozoites are seen on stool microscopy),

Syp. Metronidazle 20 mg/kg/day in 3 divided doses for 7 days

Or

Syp. Tinidazole 20 mg/kg/day for 7 days

Cholera (suspect in any child with severe watery diarrhoea)

Mainstay of treatment is fluid therapy, following antibiotic may be used to prevent spread:

Syp. Doxycycline 5 mg/kg in single dose

Or

Syp. Furazolidone 6 mg/kg/day for 3 days

Or

Syp. Cotrimoxazole (TMP) 8 mg/kg/day for 5 days.

Or

Syp. Erythromycin 30 mg/kg/day for 3 days.

Parenteral infections to be treated by appropriate antibiotics.

There is not much role of antiemetics in a child with vomiting. Rule out meningitis, URI and dyselectrolytemia and give ORS in sips. If vomiting persists give intravenous fluids. However, occasionally 1 or 2 doses of metoclopramide (0.5 mg/kg) or domperidone (0.5 mg/kg) may be tried before giving intravenous fluids.

Binding agents e.g., Kaolin pectin etc. are not useful.

Following drugs are contraindicated:

1. Antimotility agents e.g. diphenoxylate, atropine etc.
2. Antisecretory agents e.g., loperamide, salicylates etc.

Keep record of vitals e.g. pulse, BP, capillary filling time (CFT), respiratory rate (I hourly) and temperature (6 hourly). Monitor for improvement or worsening of signs of dehydration. Record urine output and stool frequency and consistency.

Modifications or step up treatment

- Admit if PEM grade III or age <3 months (as higher chances of complications e.g. shock, hypoglycaemia etc.), anxious mother, associated severe systemic infections e.g. septicaemia, meningitis or pneumonia.
- Investigate for lactose intolerance, incipient infections e.g., Urinary tract infection (UTI) or rare gut organisms, if diarrhoea persists for >7 days.
- Exclude parenchymal renal failure, if child has not passed urine after hydration. Give a fluid challenge (20 ml/kg of normal saline) followed by frusemide injection (1-2 mg/kg). If urine is still not passed then parenchymal renal failure considered and managed accordingly.

Patient/Parent education

- Information on natural course of diarrhoea to avoid dissatisfaction and that ORS only prevents dehydration i.e. purge rate and consistency usually improves by 3-7 days.

- Explain that most of the complications in diarrhoea are because of dehydration and thus ORS is the mainstay of therapy.
- Explain preparation of ORS and method of administration.
- Nutritional advise as mentioned earlier in nonpharmacological section.
- Education about food and water hygiene.

References

1. Major Symptoms and Signs of Digestive Tract Disorders. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 1102-1108.
2. Acute Diarrhoea. In: Management of Acute and Chronic Diarrhoea in Children. SK Mittal (ed.), 2nd Edition, 1999, pp 1-44.

ACUTE VIRAL HEPATITIS

Acute viral hepatitis is a systemic infection affecting liver and is caused by a number of viruses like Hepatitis A, B, C, D, E viruses etc. Commonest causes for infective hepatitis among children are Hepatitis A and Hepatitis E. Both of these are spread by faeco-oral route. Hepatitis B and C are more common in children requiring blood product for certain chronic illnesses.

Salient features

- The illness may vary from asymptomatic infection, anicteric hepatitis to icterus, and even hepatic coma.
- Prodrome constituted by fever, malaise, nausea, emesis, anorexia and abdominal discomfort may precede the appearance of jaundice. It may go unnoticed or may be severe mimicking malaria or typhoid fever.
- LFTs may be done only if the course of disease is unusual or when obstructive jaundice is suspected.

Treatment

Nonpharmacological

- Rest if the patient feels exhausted or fatigued (forced rest does not help and does not shorten the time to recovery).
- Regular small frequent meals with high caloric content. High carbohydrate diets are acceptable but should be hygienic. Traditionally sugarcane juice is used as home therapy though it has no established benefit.
- Maintain adequate hydration in case of vomiting and avoid fatty meals.

Pharmacological

There is no specific treatment for simple acute viral hepatitis. Uncomplicated cases can be treated at home.

- If patient has frequent vomiting Syp./Tab. Metoclopramide 0.1 mg/kg/ dose can be given as and when required but not to be repeated before 6 hours.
- Usually fever abates after jaundice appears. Occasionally if the situation requires, paracetamol may be used sparingly (see section on fever). Persistent high grade fever suggests alternative diagnosis.

Hospitalization required only in clinically severe illness e.g. alteration in sleep pattern, altered behaviour, abnormal movements, persistent vomiting, dehydration, decreased urinary output, bleeding from any site or any other complication.

Patient education

- Continue breast feeding or other regular feeding
- Observe carefully for any danger signs listed above
- Usually a self limiting disease and fever subsides after the jaundice is evident clinically. Most patients start recovering in 7-14 days time. Total duration of illness is 3 weeks.
- Hepatitis A and B are two different diseases. Getting your child vaccinated with hepatitis B vaccine will not protect you against Hepatitis A (see immunization schedule and appendix IX and X for details). Hepatitis A spreads through contaminated food and water and close person to person contact
- Raw or insufficiently cooked food (fruits, vegetables, salads) or cooked food handled by an infected individual can be the source of hepatitis A infection.

References

1. Viral Hepatitis. In Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 768-776.
2. Acute Viral Hepatitis. In: Harrison's Principles of Internal Medicine. Braunwald, E, Fauci AS, Kasper DL,et al (eds), 15th Edition, 2001, McGraw Hill Company Inc: New York, pp 1721-1737.

CHICKEN POX OR VARICELLA

Varicella is the primary infection caused by Varicella–zoster virus. It is highly infectious and is transmitted by droplet infection. The incubation period is about 14 days.

Salient features

- Begins as crops of small red papules over the trunk appearing within 1 day of fever and systemic symptoms which quickly develop into clear, often oval vesicles on an erythematous base. Contents become cloudy in about 24 hours and than scab. Many such crops may appear for 3-4 days.
- Bacterial superinfection, thrombocytopenia, arthritis, hepatitis, encephalitis or meningitis can complicate the disease.
- The disease is severe in adolescents and adults as well as immune compromised individual. Reactivation disease results in herpes zoster or shingles (for details see skin section).

Treatment

Nonpharmacological

- Itching is bothersome and scratching effect may be minimised by making the patient wear mittens, daily change of clothes and good personal hygiene may decrease the risk of secondary infection.

Pharmacological

Symptomatic therapy

1. For management of fever (see section on fever). Aspirin and other salicylates are contraindicated due to risk of Reye's syndrome and should not be used.
2. Local anti-pruritic agents like Calamine lotion may alleviate itching.
   If itching is not relieved with above Tab. Pheniramine 25 mg 2 times a day
   In children Syp. 0.5 mg/kg/day every hours
   Or
   Tab. Cetrizine 10 mg once a day
   In children (2-6 years) 5 mg; (>6 years) 10 mg once a day.
3. In case of immuno-compromised children on long term treatment with steroids, those on anti-cancer drugs or other immunosupressive therapy, HIV positive patients, children older than 12 years of age, those with chronic cutaneous or pulmonary disorders who are at increased risk of the severe disease oral acyclovir if started within few hours (<24 h) of the onset of rash may decrease the duration, magnitude of fever as well as the number of skin lesions. Not recommended routinely for a healthy child
   Tab. Acyclovir is 20 mg/kg/day given 6 hourly for 5 days.
   In case the patient is severely immuno-compromised, viral encephalitis or severe disease in adults Inj. Acyclovir should be started as soon as possible in all cases at the dose of 10 mg/kg 8 hourly IV for 7 days.

Assessment of response to therapy

Most cases will stop having fever after the initial 3-4 days when new crops of vesicle stop appearing. The vesicles normally heal by scabbing in about a week's time. Persistence of fever may suggest secondary infection.

The disease can be complicated by: secondary bacterial infection of skin lesion, thrombocytopenia, pneumonia – particularly in adolescents and adults, Reye's Syndrome, Post infectious encephalitis and if develops, should be treated appropriately.

Patient/Parent education

- The disease commonly is self limiting in healthy children. Child should be excluded from day care or school till after 6th day of the rash or till scabs are formed.
- Do not use over the counter fever medicines as they may contain aspirin or other salicylates.
- An expensive but potent vaccine is available for protection against the disease and can be recommended only for those at risk of severe form of the disease but are immunocompetent.
- Post exposure prophylaxis with VZIG (specific immunoglobulins) is recommended for the contacts who are severely immunocompromised or pregnant (particularly in the first trimester).

References

1. Cutaneous Manifestations of Systemic Infections. In: Text Book of Paediatric Infectious Diseases, Feigin RD, Cherry JD (eds), 4th Edition, WB Saunders Co. Philadelphia, 1998, pp 713-737.
2. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, 2000, Elk Grove Village, Illinois, US.
3. Varicella-Zoster Virus. In: Nelson's Textbook of Paediatrics, Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 973-977.
4. Viral Infections. In Textbook of Dermatology. Champion RH et al (eds), 6th Edition, Blackwell Science Ltd., pp 1015.
5. Varicella and Herpes Zoster. In: Dermatology in General Medicine. Fitzpatrick TB et al (eds), 5th Edition, the McGraw Hill Company Inc., New York, pp 2427.

MEASLES

Measles is an acute viral disease of childhood, associated with high rates of morbidity and mortality. It directly or indirectly contributes to 7% of the under five deaths in the developing world.

Salient features

- Fever, cough, coryza, conjunctivitis, an erythematous maculopapular rash appearing on the 4th day of the illness, and a pathognomonic enanthem (Koplik spots) characterize it.
- Rash starts from behind the ears, along the hairline, involve the face and then the trunk and the limbs.
- Fever usually subsides after the appearance of the rash unless there is some complication such as otitis media, bronchopneumonia, laryngotracheobronchitis (croup), and diarrhoea. Acute encephalitis, which frequently results in permanent brain damage, occurs in approximately 1 of every 1000 cases.
- Another cause of persistence of fever could be flairing up of Koch's.

Treatment

Nonpharmacological

- The patient should be isolated from other susceptible individuals particularly unimmunised children for atleast four days after the appearance of the rash.
- Bed rest is usually required and cold sponging may be required for febrile patients.
- Small frequent feeds and plenty of oral fluids should be continued.

Pharmacological

No specific antiviral treatment is available.

1. Fever is managed with oral Paracetamol (see the section on fever).
2. If there is persistent coryza or nasal itching which is disturbing the child, oral Syp. Promethazine 1 mg/kg/day in 3-4 divided doses can be used

Treatment of other co-existing problems

1. Inj. Vitamin A 100,000 IU is given intramuscularly for 2 consecutive days or else high dose oil based preparations containing 50,000 units per ml may be given. A third dose may be given 4 weeks later particularly if there are manifesting signs of vitamin A deficiency.
2. Treat appropriately the secondary bacterial infection like bronchopneumonia and/or gastrointestinal infection

Patient/Parent education

- The disease leads to marked anorexia and also often precipitates protein energy malnutrition (PEM) and other deficiencies, Regular

frequent feeds must continue. Extra meal should be added to provide for increased requirement during convalescence.

- The disease usually lasts 10-12 days and the maximum risk of infectivity is 5 days prior to and 4 days after the appearance of rash. The rash usually heals by desquamation and often leaves some hyperpigmented stains on the body which disappears over weeks subsequently.
- The parents must report to the hospital in case the child develops any of the following warning signs:
  - Stiff neck, facial twitching or convulsions (seizures), extreme drowsiness, loss of consciousness or altered behaviour.
  - Rapid and or laboured breathing, difficulty in feeding, cyanosis.
  - Significant dehydration as evident by sunken eyes or fontanels, loss of skin turgor, dryness of tongue or lack of tears etc.
  - Blood in stools
- Vaccination against measles is recommended at 7- 9 months of life and a subsequent booster with measles or MMR is mandated at 15 months of age particularly if the primary immunisation was done at less than 9 months of age. There is no role of giving measles vaccination to a child who has already suffered from the disease.
- In case any other susceptible (unimmunised child below 5 year) has been in contact with the patient of measles then it may be worthwhile to immunise this individual. Measles vaccine is useful if used early as it can prevent or decrease the severity of the disease in the secondary contacts (for details see appendix IX and immunization schedule).

References

1. Measles Virus. In: Text Book of Paediatric Infectious Diseases, Feigin and Cherry (eds.), 4th Edition, 1998, WB Saunders Co. Philadelphia, pp 2054-2074.
2. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, Elk Grove Village, Illinois, US.
3. Measles. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 946-949.

MUMPS

Mumps is a disease caused by a virus that can infect many parts of the body, especially the parotid salivary glands.

Salient features

- The parotid glands become increasingly swollen and painful over a period of one to three days. There is often a fever of up to 103^{0}F (39.4^{0}C), with headache and loss of appetite.

- Mumps can also involve the brain, pancreas and other organs. The involvement of these organs signifies a severe disease and there is usually a recrudescence of high fever in such situations in addition to organ specific symptoms.
- Meningoencephilitis is the commonest complication (250/100 000 cases). Other complications are orchitis, epididymitis, oophritis, pancreatitis, thyroiditis, myocarditis, deafness, optic neuritis and arthritis.

Treatment

Nonpharmacological

- Child should be encouraged to drink plenty of fluids. Water, decaffeinated soft drinks and tea are better tolerated than acidic fruit juices (like orange juice, grape fruit juice or lemonade) that make parotid pain worse.
- Either warm or cold packs - whichever feels better- may be used to sooth the swollen parotid glands.

Pharmacological

- Most cases are treated symptomatically on OPD basis.
- Fever when troublesome may be brought down using non aspirin fever medications such as Paracetamol (10-15 mg/kg/day SOS or every 4-6 hours). These medicines will also help relieve pain in the swollen parotid glands.
  (**CAUTION**: Aspirin is contraindicated in children with viral illnesses due to risk of Reye syndrome)
- Being a viral illness **antibiotics have no role**. There is no specific therapy available.
- Patients with abdominal pain, testicular swellings or signs of raised intracranial tension need to be admitted in the hospital.

Patient/parent education

- Parents should be explained warning signs e.g.
  - In boys, parents are told to watch for high fever, with pain and swelling of the testicles.
  - Watch for abdominal pain that can mean involvement of the pancreas in either sex, or involvement of the ovaries in girls.
  - Severe headache, stiff neck, convulsions (seizures), extreme drowsiness etc suggest CNS involvement and need for admission to a tertiary level center.
  - Recurrence of high grade fever (above 101°F/38.3°C) often heralds onset of the above complication and can be used as an early referral sign.

- Children usually recover from mumps in about 10-12 days. First attack of mumps almost always gives lifelong protection against another, therefore, such children do not benefit from any immunisation later.
- Mumps can be prevented by a vaccine which can be given alone, or as part of the mumps-measles-rubella (MMR) vaccine given at the age of 15 months. Mumps vaccine is effective in 75 to 95% of immunised persons.

References

1. Text Book of Paediatric Infectious Diseases, WB Saunders Co. Philadelphia.
2. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, 2000, Elk Grove Village, Illinois, US.
3. Mumps. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 954-955.

ACUTE FLACCID PARALYSIS (AFP)

A case of AFP is defined as any child aged <15 years, with acute onset of flaccid paralysis without any obvious cause (e.g. severe trauma or electrolyte imbalance like hypokalaemia). AFP is a notifiable disease and all cases must be reported to District Surveillance Officer (Tel No. 01-398 3076).

Salient features

- The paralysis is of acute onset (<4 weeks) and the affected limb(s) are flaccid (floppy or limp). If the AFP is due to polio, then sensation is never affected. Other important differentials to be considered in cases with AFP are detailed in Table 1.
- Pseudoparalysis due to pain in congenital syphilis, osteomyelitis, abscess, scurvy, unrecognized trauma leading to contusions, slipped epiphysis or fractures etc can also mimic AFP.

The following section details the treatment for acute POLIO cases only

Treatment

All cases should be treated as below except patients with isolated single lower limb involvement and reporting after 4 days of onset of paralysis and currently not progressing for more than 48 hours.

Table 1: ***Important differential diagnosis of AFP (adapted from Field Guide, MO HFW, GOI):***

Signs and Symptoms	Polio	GBS	Transverse Myelitis	Traumatic or injection neuritis
Age	Most cases occur under 3 years of age	Usually above 2 years of age	Mostly above 4 years of age	No age limit
Progression of paralysis	24-48 h onset to full paralysis	Hours to days	Hours to 4 days	hours to 4 days
Fever onset	High always present at onset of flaccid paralysis disappears the following day	Not Common	Rare	Commonly present before, during and after paralysis
Flaccidity	Acute, asymmetrical, proximal	Acute, symmetrical, distal	Acute lower limbs symmetrical	Acute, asymmetrical limb
Muscle tone	Diminished	Diminished	Diminished in lower limbs	Diminished in affected limb
Deep Tendon Reflexes	Decreased or absent	absent	Absent in lower extremities, later hyper-reflexia	Decreased or absent
Sensation	Severe myalgia but no sensory deficit	Cramps, tingling hypoanesthesia of palms and soles	Anesthesia of the lower limbs with sensory loss	Pain in gluteal region
Cranial nerve	Only in bulbar or bulbospinal cases Loss of gag reflex most common	Often present, affecting VII, IX, X, XI, XII	Absent	Absent
Raspiratory insufficiency	Only when bulbar and bulbospinal involving respiratory muscles	In severe cases	Sometimes	Absent
CSF WBCs protiens	High WBCs Normal or slightly increased	<10 High	Normal Normal or slightly evevated	Normal Normal
Bladder dysfunction	Absent	Transient	Present	Never
Nerve conduction velocity in 3rd week	Abnormal, anterior horn cell disease	Abnormal, demyelination	Normal of abnormal has no diagnostic value	Abnormal in sciatic nerve
EMG 3rd Week	Abnormal	Normal	Normal	Normal
Sequelae at 3 months and up to a year	Severe asymmetrical atrophy, skeletal deformities may develop later	Symmetrical atrophy of distal muscles diplegia, atrophy after years	Flaccid	Moderate atrophy only in affected lower limb

Nonpharmacological

- Complete bed rest and correct positioning of the affected limbs in the optimal position as follows:
- Hip – slight flexion, knee – 5 degrees flexion, foot – 90 degrees with support against the soles. Both legs should be supported from the lateral sides with pillows or rolled towels or salt/sand packs to prevent rotation. When pain subsides, passive movements of the joints for about 10 minutes, 2-3 times a day.
- Warm water fomentation using hot packs with soaked towels wrapped around the affected parts for about 10 minutes, 2-3 times a day help in relieving pain.
- If transient urinary retention occurs, alternate hot and cold compresses over the suprapubic region.

CAUTION: No massage of intramuscular injections may further precipitate paralysis. Watch for progression, particularly for the involvement of the respiratory muscles.

Pharmacological

There is no specific drug therapy for polio.

For fever and pain use paracetamol or ibuprofen (see section on fever).

Referral to a tertiary care level center with a ventilatory support facilities if there is progression of paralysis, respiratory distress, bulbar involvement, paralysis of upper limbs involvement which is <3 days old (there is higher risk of diaphragmatic involvement in such cases), marked drowsiness or any other complication.

Patient/Parent education

- No dietary restrictions, however, continue breast feeding or other regular feeding.
- Paralysis progresses usually for about 4-7 days after onset. Recovery may start thereafter over days to weeks with little recovery of strength after 6 months of illness. A regular physiotherapy facilitate recovery of muscles.

Note: Post Polio Residual paralysis should be referred for rehabilitative services to an appropriate centre.

References

1. Surveillance of Acute Flaccid Paralysis. Field Guide, 2nd Edition, Child Health Division, Department of Family Welfare, Ministry of Health and Family Welfare, January 2000.
2. Enteroviruses. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 956-964.

PERTUSSIS (WHOOPING COUGH)

This results from *Bordetella pertusis* infection leads to this respiratory disorder which can have long term poor effects on health.

Salient features

- Beginning as a mild upper respiratory tract infection (catarrhal stage), can progress to severe paroxysms of cough, often with a characteristic whoop, followed by vomiting.
- The child runs out of breath with bulging eyes, flushed face, lacrimation, salivation, protrusion of tongue and distension of the neck veins etc. Such episodes are exhausting and precipitated by yawning, sneezing, eating or even suggestion. The patient appears minimally ill in between the attacks.
- Fever is absent or minimal. The duration of cough may be 6-10 weeks.
- Complications include cough, syncope, hypoxic seizures, pneumonia, encephalopathy and death.

Treatment

Pharmacological

1. Syp./Tab. Erythromycin, 40-50 mg/kg/day in 4 divided doses orally for 14 days initiated early in the coryzal phase of the disease i.e. first 14 days of the illness may shorten the course of whooping cough, which otherwise may last for weeks or months. Later once the paroxysms start, no antimicrobial have any benefit except for eradication of any secondary pulmonary infection.
2. In patients with severe coughing paroxysms salbutamol 1-2 mg/kg/day in 3-4 divided doses for a week or so may be tried.
3. Severe cases particularly those <6 months of age and those with respiratory distress need to be admitted for intravenous fluids and oxygen therapy.

Supportive therapy

- Oxygen therapy is required in severe cases with respiratory distress. Hydration should be maintained with intravenous or oral fluids in adequate amounts (cough suppressants are usually not helpful).

Patient/parent education

- Explain the need to continue feeding during the prolonged period of cough, adequate hydration and nutrition to prevent onset of malnutrition.
- Antibiotic therapy must be continued for at least 14 days to prevent relapse of the disease, even if they may not be providing any relief in the symptoms
- All contacts below 7 years of age must be given erythromycin for 14 days.
- Contact the doctor immediately if the patient develops listlessness, apnea or seizures. This is particularly more common in infants below 6 months.

- Immunization against pertussis is available in our country as triple antigen (DPT) and 3 primary doses are routinely advised for all infants followed by a booster after 1.5 years and 4.5 years after the primary immunization. The primary immunization is expected to reduce the disease burden by two third.

References

1. Text Book of Paediatric Infectious Diseases, WB Saunders Co. Philadelphia.
2. American Academy of Paediatrics. In: Report of the Committee on Infectious Diseases, 25th Edition, Elk Grove Village, Illinois, US.
3. Pertussis (*Bordetella pertussis and B. parapertussis*). In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 838-842.

CARDIAC FAILURE

Cardiac failure is defined as a state in which the heart cannot deliver an adequate cardiac output to meet the metabolic needs of the body. Clinical presentation is dependent on age and degree of cardiac reserve. Common causes according to age of presentation are:

Neonate - Severe anaemia, heart block, congenital heart disease e.g. hypoplastic left heart, co-arctation, left to right shunt and large mixing cardiac defects.

Infant - Left to right shunt, supraventricular tachycardia

Child - Rheumatic fever, myocarditis, cardiomyopathy, acute hypertension e.g., acute glomerulonephritis.

Salient features

- Exertional dyspnoea, poor weight gain, feeding difficulties, breathes too fast and better when upright, persistent cough and wheezing, excessive perspiration and irritability, puffiness of face and pedal oedema
- Tachypnoea, tachycardia, small volume pulse, peripheral cyanosis, pedal/facial/ sacral oedema, hepatomegaly, raised JVP (appreciated well in older children), gallop rhythm, cardiomegaly and failure to thrive.

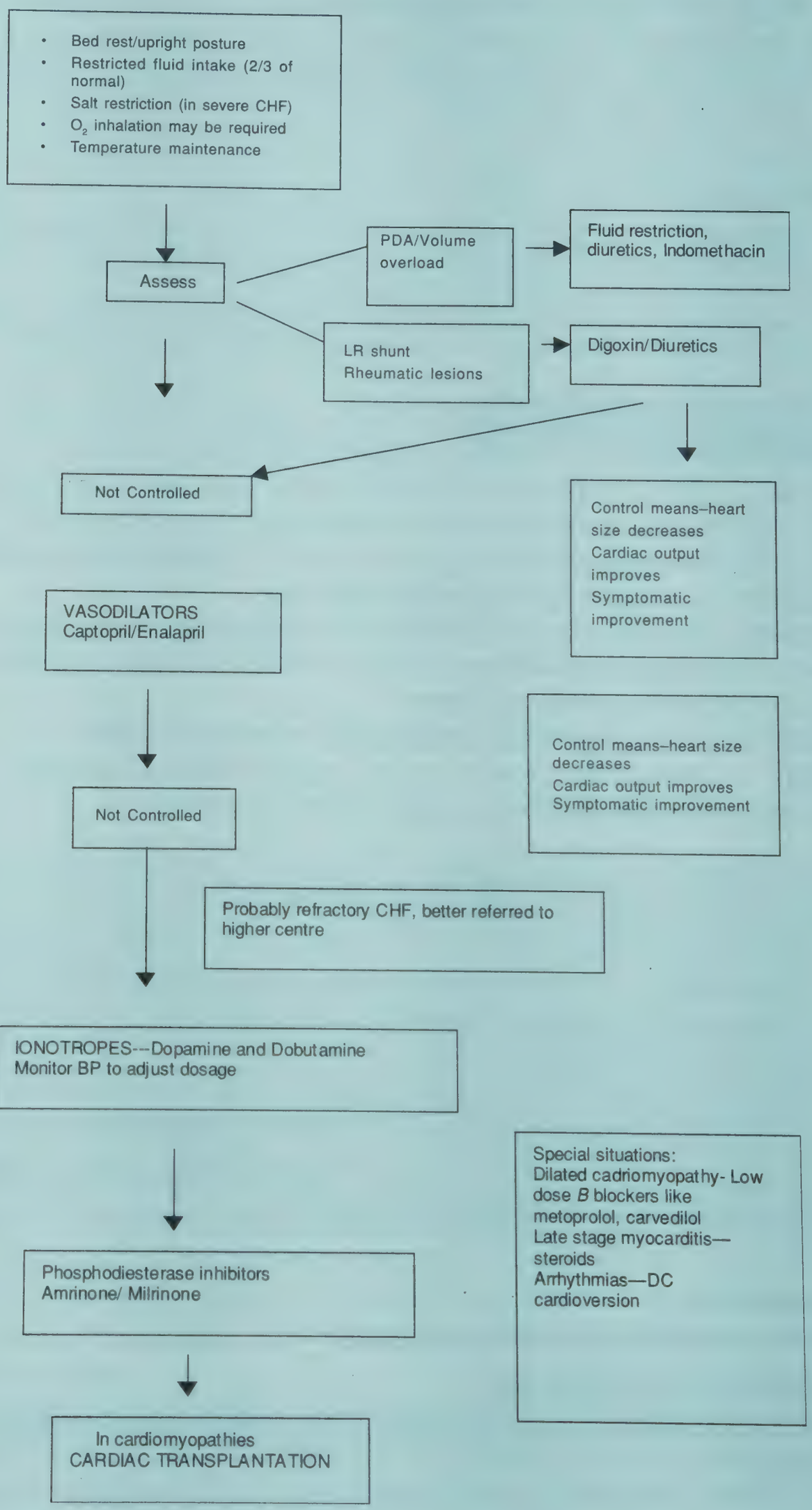
Treatment

Identify and treat the underlying cause.

Nonpharmacological

Restricted activity and bed rest with upright posture depending on cardiac reserve.

Figure 1. *Alogrithm for treatment of congestive heart failure*



In severe CHF, dietary modifications in infants by increasing calories per feed. Breast-feed supplementation, naso gastric feed to avoid the exertion of active feeding.

No added salt in diet and fluid restriction and cold sponging in case of fever.

Pharmacological

Algorithm for treatment is shown in Figure 1.

1. Elixir/Tab. Digoxin (Elixir 0.25 mg/5 ml, Tab. 0.25 mg)

   Method of digitalization: 0.5 x digitalization dose initially, 0.25 x digitalizing dose 8 and 16 hours later.

   Digitalizing dose: newborn = IV, IM: 0.010 - 0.030 mg/kg divided or orally: 0.040 mg/kg divided in fractions.

   Infants = IV, IM 0.030 - 0.040 mg/kg or orally 0.050 mg/kg in fractions.

   Childrens = IV, IM, PO: 0.010 - 0.015 mg/kg in fractions

   For maintenance: begin maintenance dosage 24 hours after 1st fraction of digitalizing dose. Newborn = PO: 0.005 - 0.010 mg/kg/24 hours, divided every 12 hours. In infants and children orally 0.002 - 0.005 mg/kg/24 hours divided every 12 hours.

   (**CAUTION**: Avoid hypokalaemia during therapy with digoxin)

2. Tab. Frusemide 1-2 mg/kg every 12 hourly. (may need K supplement).

   Or

   Tab. Chlorothiazide 20-50 mg/kg/day in 2 divided doses.

   Or

   Tab. Spironolactone 1-3 mg/kg/day in 2 divided doses.

3. In cases with regurgitant cardiac lesions like severe MR where reduction in after load is required

   Tab. Captopril 0.1-0.2 mg/kg/dose 8-12 hourly (maximum 4 mg/kg/day)

   Or

   Tab. Enalapril 0.08-0.5 mg/kg/dose 12-24 hourly (maximum 1 mg/kg/day)

4. Patients with hypotension and low cardiac output should be referred to a higher center)

Inj. Dopamine infusion (40 mg/ml) 2-20 mcg/kg/min prepared in normal saline or 5% dextrose. Hypovolaemia should be corrected before infusion is started and BP is monitored during the infusion.

Or

Dobutamine infusion (250 mg/5 ml) 2- 20 mcg/kg/min. Both the drugs can be used simultaneously to have added response because of different mechanism of actions.

Patient/parent education

- Decreased salt intake should be emphasised

- Sufficient rest and adequate sleep must be emphasised. Strict bedrest is necessary only in severe cases.
- Semi-upright position during sleep may make the patient more comfortable.

References

1. Heart Failure. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 1440-1445.
2. Eugene Braunwald: Heart Disease 56: 1721,1992.

RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE

Rheumatic fever is a multi system inflammatory disease that occurs as a delayed sequalae to group A Beta haemolytic streptococcal pharyngitis. The disorder is largely self limited and resolves without sequelae but chronic and progressive damage to heart valves lead to rheumatic heart disease (RHD).

Salient features

- Presence of two major or one major and two minor criteria in addition to evidence of recent streptococcal infection (raised ASO titer, positive throat swab or recent scarlet fever) is necessary for diagnosis of Rh fever
- Major criteria: arthritis, carditis, subcutaneous nodules, chorea, erythema marginatum
- Minor criteria: fever, arthralgia, elevated acute phase reactants (ESR, CRP) and prolonged PR interval
- RHD most frequently affects mitral and aortic valve. Isolated aortic valve involvement is rare and tricuspid and pulmonary valve involvement is unusual.
- Complications of RHD are cardiac failure and infective endocarditis

Treatment (Acute rheumatic fever)

Nonpharmacological

Avoid vigrous activity till ESR normalizes. In severe CHF, salt restriction, fluid restriction, upright posture. Protect patient from getting injured in chorea.

Pharmacological

1. In arthritis only:
   Tab. Aspirin 90-120 mg/kg/day in 4 divided doses for 10-12 weeks to be given after meals. During therapy monitor for tinnitus, deafness, respiratory alkalosis/acidosis.
   In carditis without CHF: As above.
   In carditis with CHF: Tab. Prednisolone given after meals in dose of 2.5 mg/kg/day 2 divided doses for 3 weeks then tapering over next 3 weeks. During tapering add Aspirin as above and continue it for 4-6 weeks. Monitor blood pressure and blood sugar.
2. For treatment of CHF see section on CHF.
3. In Chorea: Tab. Haloperidol 0.05 mg/kg/day divided doses 2-3 divided doses; dose titrated according to response.
4. Inj. Procaine penicillin 4 lac units IM twice daily for 10 days.
   Or
   Inj. Benzathine penicillin G 1.2 mega units (>27 kg), 0.6 mega units (<27 kg) IM single injection.
   Or
   Tab. Penicillin V 125-250 mg twice daily for 10 days.
   Or
   Tab. Erythromycin 40 mg/kg/day 3 times a day for 10 days.

Usually joint pains disappear within 24 to 48 hours, tachycardia settles, pericardial friction rub if present disappears and gradually ESR comes to normal.

In established cardiac lesions with CHF not controlled by medical management patient should be referred to a higher centre for surgical intervention.

For secondary prevention (for prevention of recurrences)

Inj. Benzathine penicillin G 1.2 mega units (>27 kg), 0.6 mega units (<27 kg) IM every 3 weeks.

Or

Tab. Penicillin V 250 mg 2 times a day.

Or

Tab. Sulfadiazine 500 mg once daily.

Or

Tab. Erythromycin 250 mg 2 times a day.

Duration of secondary prevention is individualized. In patients with established valvular lesion prophylaxis should be given for life long or at least till theage of 35 years. In others it is given for atleast 5 years after the most recent attack or till the age of 18 years which ever comes first.

In acute rheumatic fever observe for appearance of valvular lesions (most common in the first four weeks of disease) and in RHD for effort intolerance,

signs and symptoms of CHF, echocardiographic studies of cardiac functions.

Patient/parent education

- Early and adequate treatment of sore throat.
- Emphasize the importance of regular prophylaxis with benzathine penicillin.
- Patients with RHD should avoid contact with sore throat cases and if possible environmental modification e.g., avoid overcrowding.

References

1. Rheumatic Fever. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 754-760.
2. Eugene Braunwald: Heart Disease 56: 1721,1992.

DIABETES MELLITUS (DM)

Most of the cases of DM in children are of insulin dependent diabetes Mellitus (IDDM) and have hyperglycaemia with glucosuria.

Salient features

- While some cases present with classical symptoms of polyphagia, polydipsia, polyuria and weight loss, many children at the onset present in the state of diabetic ketoacidosis (DKA). A minority of cases, while asymptomatic are detected to have glucosuria and hyperglycaemia.
- Diagnosis of DM is made by demonstration of hyperglycaemia (random plasma glucose more than 200 mg/dl). Following cut off levels of plasma glucose are used for diagnosis of DM while doing oral glucose tolerance test (GTT) -after a glucose dose of 1.75 g/kg of ideal body weight (maximum 75 g).

Time	Normal range	DM diagnosis
Fasting	70 -105 mg/dl	≥ 115 mg/dl
60 minutes	120 -170 mg/dl	≥ 200 mg/dl
90 minutes	100- 140 mg/dl	≥ 200 mg/dl
120 minutes	70- 120 mg/dl	≥ 140 mg/dl

- Patients during DKA have moderate to severe dehydration with plasma glucose levels usually more than 300 mg/dl, metabolic acidosis, ketonuria and various electrolyte disturbances.

Treatment

Nonpharmacological

Diet

- Regularity of eating pattern is very important so that diet and insulin dosing is synchronised.
- General nutritional guidelines are followed.
- Calorie mixture should have 55% carbohydrates, 30% fat and 15% proteins.
- Avoid carbohydrate with refined sugars to prevent metabolic swings. Carbonated drinks should be of sugar free variety.
- Fats derived from animal sources to be reduced and should be replaced by fats of vegetable origin.
- Calorie intake should be split as 20% breakfast, 20% lunch, 30% dinner and 10% each for 3 snacks at mid morning, mid afternoon and evening.

Physical activity and fitness

- Usual exercises advised to diabetic children and adolescents include vigorous walking, jogging, swimming, tennis etc. Though, diabetics can undertake any exercise, but unusual exercise may require modification in insulin dosing. For the schedule day of unusual exercise, insulin dose may be reduced by 10-15%.

Pharmacological

Initial therapy

Treatment is initiated in the hospital with fast acting (regular) insulin.
At the onset of DM (or after recovery from DKA) the dose of insulin is 0.5-1.0 unit/kg/day.
Inj. Regular insulin 0.1-0.25 units/kg subcutaneous injections are given 6-8 hourly before meals.
Simultaneous blood glucose level monitoring is done. One to two days therapy is required to find out total daily insulin requirement. Once the patient stabilises on 6 hourly insulin injections, the patient is switched over to "2 daily injections" schedule.

In "2 daily injections" schedule, the insulin is administered as follows:

- Combinations of intermediate acting (usually lente) insulin and fast acting (regular) insulin is used in the ratio of 2-3:1. Two third of total daily -dose is injected before breakfast and one third before dinner. Each injection has combination of both types of insulin e.g., total dose of insulin is 30 units -20 units (14 units lente and 6 units regular) are injected before breakfast and 10 units (6 units lente and 4 units regular) are injected before dinner.

- Blood glucose levels are monitored before each meal and the dose of insulin adjusted accordingly. Blood glucose levels should ideally be 80 mg/dl fasting and 140 mg/dl after meals (acceptable range between 80 -240 mg/dl). Early morning 3 AM blood glucose level should be more than 70 mg/dl.

Following modification in the insulin doses will be required depending upon the blood glucose levels:

Time and blood glucose	Type and time of insulin modified
1. High fasting blood glucose	Evening lente insulin is increased by 10%
2. High noon blood glucose	Morning regular insulin is increased by 10%
3. High pre dinner blood glucose	Morning lente insulin is increased by 10%
4. High pre bed time blood glucose	Evening regular insulin is increased by 10%
5. Low fasting blood glucose	Evening lente insulin is decreased by 10%
6. Low noon blood glucose	Morning regular insulin is decreased by 10%
7. Low pre dinner blood glucose	Morning lente insulin is decreased by 10%
8. Low pre bed time blood glucose	Evening regular insulin is decreased by 10%

- Any increase or decrease in insulin dose is by 10- 15%. Generally not more than 6 units.
- After initial stabilisation, newly diagnosed cases may have gradual decline in insulin requirement even upto 0.5 units/kg/day. This may persist for several weeks to several months.
- Decrease total dose of insulin by 10% at the time of discharge from hospital as the increased activity at home will decrease the insulin requirement.

Assessment of diabetic control or response to therapy

- Blood glucose estimation should be done before each meal and at bed time in the first few weeks after diagnosis. After stabilisation, it can be reduced to twice a week.
- Periodically blood glucose estimation at 3-4 AM is required to detect early morning hypoglycaemia.
- Urine for sugar is also monitored initially 3-4 times daily before meals. This can be done less frequently after initial few weeks, preferably on the days when blood sugar is not done.
- Urine for ketones once daily should be done.
- Glycosylated haemoglobin (HbA1 C) estimation-once every 3 months. -HbA1C levels of 6-9% represent very good control of diabetes, 9 - 12% show fair control and above 12% represent poor control.
- Serum lipids -cholestrol, HDL, LDL, VLDL, triglycerides and urine for protein should be done once every year. Serum cholestrol should be less than 200 mg/dl, LDL less than 130 mg/dl and triglycerides less than 140 mg/dl.
- Thyroid function tests should be done once every year to detect concomitant hypothyroidism.

For management of hypoglycemia and diabetic ketoacidosis see chapter 11 on hormonal disorders.

Patient/parent education

Patient/parents should be taught self diabetic care which should include:

- Technique of measuring insulin in the syringe.
- Importance of drawing insulin always in the same sequence (usually regular insulin first) so that same type of insulin is left over in the dead space of the syringe.
- Explain technique of subcutaneous injections and importance of rotating the injection sites - arms, thighs (upper and lower), buttocks and abdomen.
- Monitoring urinary sugar – by the double void method (void 30 minutes before the test void).
- Blood sugar monitoring, maintaining the records of treatment and sugar levels
- Adherence to diet.
- Regular exercise.
- Recognising the symptoms of hypoglycaemia and its home management.

References

1. Diabetes Mellitus. In Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 1767-1791.

HYPOTHYROIDISM

Hypothyroidism is characterized by decrease in the function of the thyroid glands. Most cases in children are due to congenital hypothyroidism causes such as aplasia, hypoplasia or ectopia of thyroid gland. Common causes of acquired hypothyroidism are iodine deficiency, lymphocytic thyroiditis and following irradiation of cervical region for malignant disorders. Diagnostic studies and treatment are same as that for congenital hypothyroidism.

Salient features

- Congenital hypothyroidism is difficult to diagnose in neonatal period as the symptoms and signs may not be fully developed. However, prolongation of physiological jaundice and feeding difficulty in the form of sluggishness and choking during feeding occur. Infants cry less, sleep more and have constipation, abdominal protuberance and umbilical hernia. Infants with these features should be screened by thyroid function tests to avoid delay in diagnosis. Gradually the features of physical and mental retardation become more obvious which can be severe.

- The diagnosis is based on demonstration of low serum of T4. Serum T3 levels may be normal and are not useful for diagnosis. In primary hypothyroidism, TSH is elevated. Radionuclide scans are not essential for diagnosis but help to delineate the exact aetiology.

Treatment

Pharmacological

Initiation of therapy: L-thyroxine (Tab., 50 and 100 mcg).

Initial dose in neonatal period is 10-15 mcg/kg/day (usually 37.5-50 mcg per day), given as a single daily dose half an hour before food. The tablet can be crushed and mixed in expressed breast milk or any other liquid for small infants.

Treatment is required life long and the requirement keeps changing with increasing age. In later part of infancy dose decreases to 5-6 mcg/kg/day then to 3-4 mcg/kg/day in children and the adult dose is 2 mcg/kg/day.

Assessment of response: Early response is evident in initial few weeks and consists of symptomatic improvement in alertness, relief of constipation, improvement in appetite and feeding. Increased linear growth and osseous maturation is seen over next few months.

- The child should be followed clinically every month for 6 months, 3 monthly till 2 years and thereafter once to twice every year. Recurrence of symptoms such as lethargy, constipation and weight gain suggest undertreatment and diarrhoea, palpitations, increased appetite and weight loss suggest overdosing.
- Periodic check on thyroid function tests is needed (6 monthly or so). Serum T4 level should be maintained in upper normal range and TSH levels suppressed to normal.
- After few months of starting therapy, sometimes features suggestive of raised intracranial tension such as headache and vomiting may appear. The patient should be immediately admitted and treated.

Patient /parent education

- Patient should be told about the need for life long administration of the drug.
- Regular follow up at the interval described above is important for proper monitoring and dose titration.
- Clinical symptoms of under or overdosage, including the danger signs of pseudotumour cerebri should be explained.

References

1. Hypothyroidism. In: Nelson's Text Book of Paediatrics. Behrman, Liegman, Jenson (eds), 16th Edition, 1999; pp 1698-1704.

URINARY TRACT INFECTION (UTI)

Urinary tract infection (UTI) is a common bacterial infection in infants and children. One percent boys and 3-5% girls below 14 years develop UTI. Risk of UTI is higher in children with congenital urinary tract anomalies, chronic diarrhoea and malnutrition.

Salient features

- Symptoms are nonspecific. In neonates, it presents as a part of septicaemia, in infants and young children with fever, diarrhoea, vomiting also pain and poor weight gain.
- Older children may have burning, urgency, frequency, flank pain, turbid urine and recent onset enuresis. Diagnosis is confirmed by growth of significant number of organisms of a single species in the urine (Table 1).

Treatment

Nonpharmacological

Maintain adequate hydration and encourage liberal fluid intake to alleviate dysuria

(**Note:** Alkalinization of urine is not necessary)

Pharmacological

Therapy should be started after obtaining urine culture. Patient's age, degree of toxicity, state of hydration, ability to retain oral intake and the likelihood of compliance with medication help in deciding therapy.

Complicated UTI and/or age less than 3 months

1. Inj. Ampicillin 100 mg/kg/day IV in 3 divided doses for 10 to 14 days
2. Inj. Gentamicin 5-6 mg/kg/day in 2 divided doses for 10 to 14 days

Or

Inj. Cefotaxime 100-150 mg/kg/day IV in 3 divided doses for 10 to 14 days

Or

Inj. Ceftriaxone 75-100 mg/kg/day IV in 1-2 divided doses for 10 to 14 days

Table 1. *Interpretation of urine culture*

Method of collection	Colony count	Probability of infection
Suprapubic aspiration	Urinary pathogen in any number	99%
Urethral catheterization	≥50 x 10^3 CFU/ml	95%
Midstream clean catch	>10^5 CFU/ml	90-95%

CFU: colony forming units.

Definitions:

Significant bacteriuria	Colony count of >10^5/ml of a single species in a midstream clean catch sample
Asymptomatic bacteriuria	Presence of significant bacteriuria on two or more specimens in a child with no symptoms
Recurrent UTI	Second attack of UTI
Complicated UTI	Presence of fever >38.5°C, toxicity, persistent vomiting, dehydration and renal angle tenderness
Simple UTI	UTI with low grade fever, dysuria, frequency, urgency but none of the above symptoms

Complicated UTI and age 3-6 months

1. Inj. Gentamicin 5-6 mg/kg/day IV in 2 divided doses for 10 to 14 days UTI > 3 months.
2. Syp. Amoxycillin 30-50 mg/kg/day in 3 divided doses for 7 to 10 days.

   Or

   Syp. Cotrimoxazole (Trimethoprim) 6-10 mg/kg/day in 2 divided doses for 7-10 days.

   Or

   Syp. Cephalexin 50-70 mg/kg/day in 3 divided doses for 7-10 days.

   (**CAUTION**:Quinolones should be avoided as first line medication; their use is guided by results of culture and sensitivity)

Nalidixic acid or Nitrofurantoin should not be used to treat UTI since they do not achieve therapeutic concentration in renal parenchyma and blood stream.

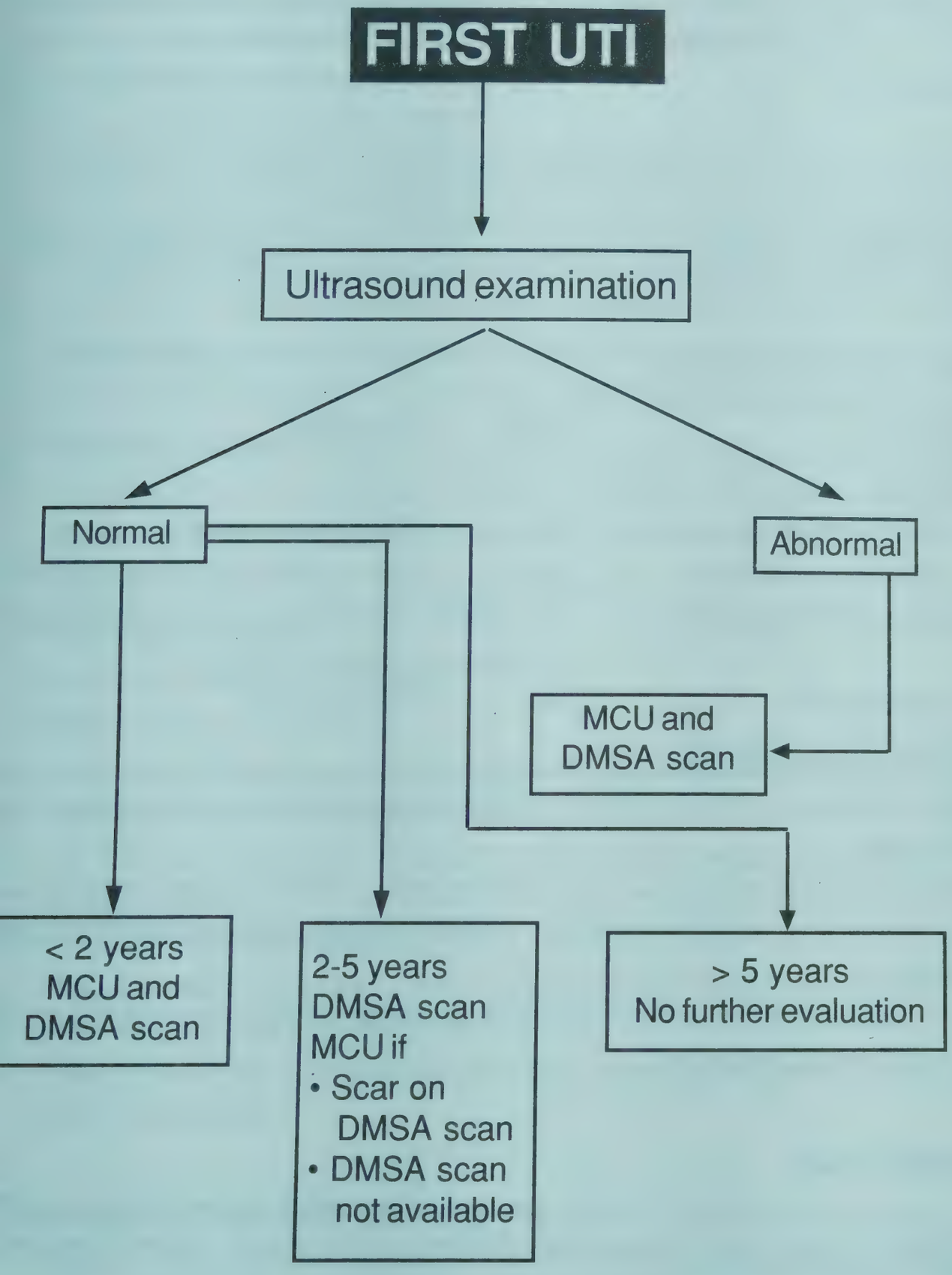
Monitoring

An abdominal ultrasound examination and repeat urine culture are necessary in patients who fail to show clinical response (reduction of fever and toxicity) within 48 hours of initial treatment.

Workup of a case of first UTI is shown in Figure 1. Child with more than one episode should be worked up for cause of recurrent UTI. Each episode is treated as mentioned above but child should be investigated in detail

with ultrasound, MCU and DMSA scan and prophylaxis for recurrence as in Table 2 and 3.

Figure 1. ***Workup of a cases of first UTI***



Antibiotic prophylaxis in recurrent UTI

Long term, low dose antibacterial prophylaxis is used to prevent recurrent febrile UTI.

Table 2. ***Antimicrobials for prophylaxis of UTI***

Drug	Dose(mg/kg/day)	Remarks
Cotrimoxazole	1-2 (trimethoprim)	Avoid in infants < 3 months age and G-6PD deficiency
Nitrofurantoin	1-2	Gastrointestinal upset; avoid in infants < 3 months age, G-6 PD deficiency and renal insufficiency
Cephalexin	10	Drug of choice in first 3-6 months of life.

Table 3. ***Indications and duration for antimicrobial prophylaxis***

Findings	Age	Duration
First UTI		
Reflux and renal scar present	All	Till 5 years of age*
No reflux but renal scar	All	Six months and re-evaluate**
No reflux, no renal scar	< 2years	Six months and re-evaluate**
	> 2years	No prophylaxis
Recurrent UTI (without reflux or scar)	All	Six months

* Child >5 years of age at initial evaluation prophylaxis for 12-18 months, reevaluate

**DRCG/MCU to look for vesico urethral reflux (VUR), which might have been missed on initial evaluation. Prophylaxis is stopped if VUR is not detected.

Note: Grade IV (bilateral) and Grade V - prophylaxis given up to 1 year, then surgery is indicated.

References

1. Consensus Statement on Management of Urinary Tract Infections. Indian Paediatric Nephrology Group, Indian Academy of Paediatircs. Indian Paediatrics, 2001, 38: 1106-1115.

ACUTE GLOMERULONEPHRITIS (POST-STREPTOCOCCAL)

It follows streptococcal infection of throat or skin by 1-2 weeks. Complications like congestive heart failure or encephalopathy may occur in a few patients. Diagnosis is clinical with urine showing RBC's, WBC and mild proteinuria. Serum C_3 levels may be low. Disease is self limiting and generally resolves in one month, however, microscopic urinary changes may persist up to one year.

Salient features

- Sudden onset of gross haematuria, proteinuria, oedema, hypertension, oliguria and other features of renal insufficiency.

Treatment

Child should be admitted for monitoring and treatment, if complications occur.

Nonpharmacological

- Routine activity need not be restricted unless features of acute renal failure or severe hypertension occur.
- Diet is restricted like in acute renal failure

Pharmacological

There is no specific treatment

Treatment of hypertension

1. Inj. Fursemide (40 mg) 1-2 mg/kg/day in 2 divided doses till oliguria lasts
2. Cap. Nifedipine 0.25 mg/kg SOS
3. Inj. Procaine penicillin 4 lac units once daily if evidence of sore throat or skin infection

Monitoring and follow up with

- Regular weight record, strict intake-output chart, blood pressure recording should be done regularly.
- Refer to a higher centre if hypertension, haematuria or renal failure are not manageable.

Patient/Parent education

- Parents should be explained the natural course. More than 95% recover within 2-4 weeks. Only a few patients may end up with chronic renal insufficiency.

References

1. Gross or Microscopic Haematuria. In: Nelson's Text Book of Paediatrics, Behrman, Liegman, Jenson (eds), 16th Edition, 1999; pp 1581-1584.

NEPHROTIC SYNDROME (NS)

Nephrotic syndrome is an important chronic disorder in children. It can be primary (idiopathic) or secondary (SLE, Henoch Shonlein purpura, amyloidosis etc). About 90% children with idiopathic nephrotic syndrome have 'minimal lesion' on renal histology and respond promptly to corticosteroids. Approximately three fourth patients have one or more relapses. Steroid toxicity and frequent serious infection complicate such cases.

Salient features

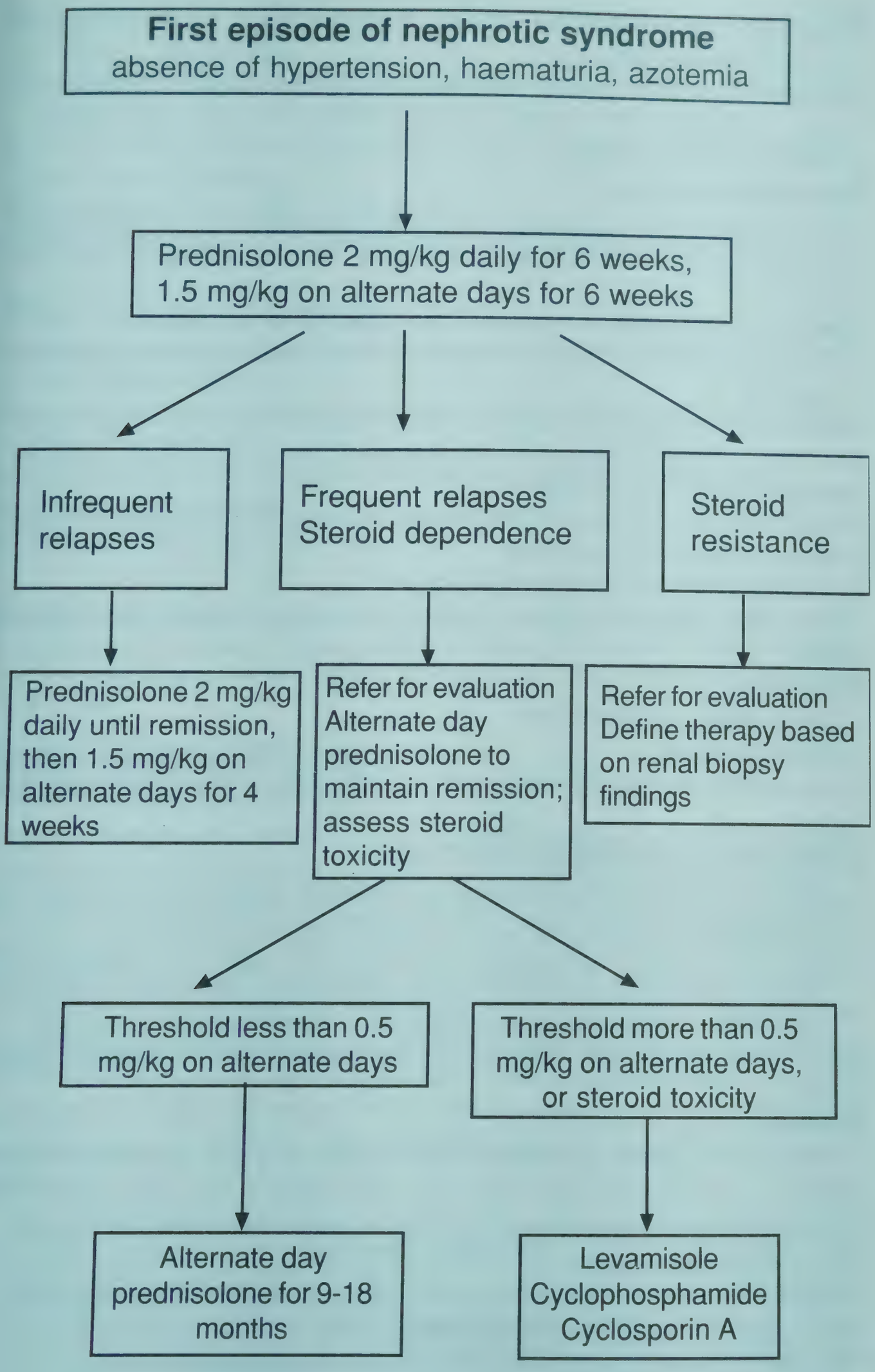
- Heavy proteinuria, hypoalbuminaemia (S. Albumin <2.5 g/dl), hyperlipidaemia (S. Cholesterol >200 mg/dl) and oedema. Dipstick or heat coagulation of urine shows 3+/4+ proteinuria.
- Investigations which help in diagnosis and management are urine analysis, blood counts, S. cholesterol, S. proteins, blood urea, S. creatinine, urine culture, X-ray chest, Montoux, HBsAg

Figure 1. ***Treatment of nephrotic syndrome without hypertension, haematuria and azotaemia.***

Treatment

Definitions useful for guiding treatment are as follows:

Remission	- Urine albumin nil or trace (or proteinuria <4 mg/m^2/h) for 3 consecutive days.
Relapse	- Urine albumin 3+ or 4+ (or proteinuria >40 mg/m^2/h) for 3 consecutive days having been in remission previously
Frequent relapses	- Two or more relapses in six months of initial response, or more than three relapses in any twelve months
Steroid dependence	- Two consecutive relapses when on alternate day steroids or within 14 days of its discontinuation
Steroid resistance	- Absence of remission despite therapy with 4 weeks of daily prednisolone in a dose of 2 mg/kg per day.


First episode of nephrotic syndrome
absence of hypertension, haematuria, azotemia
Prednisolone 2 mg/kg daily for 6 weeks, 1.5 mg/kg on alternate days for 6 weeks
Infrequent relapses
Frequent relapses Steroid dependence
Steroid resistance
Prednisolone 2 mg/kg daily until remission, then 1.5 mg/kg on alternate days for 4 weeks
Refer for evaluation Alternate day prednisolone to maintain remission; assess steroid toxicity
Refer for evaluation Define therapy based on renal biopsy findings
Threshold less than 0.5 mg/kg on alternate days
Threshold more than 0.5 mg/kg on alternate days, or steroid toxicity
Alternate day prednisolone for 9-18 months
Levamisole Cyclophosphamide Cyclosporin A

Nonpharmacological

- Avoid saturated fats
- Adequate proteins, and salt restriction only during oedema, avoid extra salt
- Good physical activity

Pharmacological

Investigations to rule out infection should be done before starting treatment with steroids i.e. urine culture & sensitivity, Montoux, X-ray chest, Hb, HbsAg.

Treatment of Oedema - in case of moderate to severe edema

1. Tab Frusemide 1-3 mg/kg/day in 1-2 doses given preferably in the morning.

Treatment of nephrotic syndrome without hypertension, haematuria and azotemia is given in Figure I. Presence of the these features points towards nonminimal change.

If oedema does not respond Tab Spironolactone 2-4 mg/kg/day as single dose preferably in the morning.

A gradual reduction of oedema is better

Patient with refractory severe oedema should be referred to a higher centre.

Monitoring

1. Urine output, weight record
2. Blood pressure
3. Urine albumin daily till remission

Infection in nephrotic syndrome

1. Patients of nephrotic syndrome with Montoux positive but no evidence of disease should be put on INH prophylaxis for 6 months.
2. Absence of florid symptoms and signs may delay the diagnosis of serious infections like peritonitis and cellulitis in nephrotics. Systemic antibiotics should be used aggressively if infection is suspected.

Indications for kidney biopsy (to be carried out at tertiary care level)

At onset

<1 year or >15 years persistant microscopic or gross haematuria, low serum C_3 substained hypertension; renal failure not attributable to hypovolemia; or suspected secondary causes of nephrotic syndrome

After initial treatment

Proteinuria persisting despite 4 weeks of daily corticosteroid therapy

Before starting treatment with cyclosporine-A

Frequently relapsing or steroid dependent nephrotic syndrome.

Indications for referral to a higher centre

- Onset <1 year of age
- Nephrotic syndrome presenting with hypertension, persistent microscopic or gross haematuria, or impaired renal function
- Complications like refractory oedema, thrombosis, severe infections and steroid toxicity
- Resistance to steroids: initial or late
- Frequently relapsing or steroid dependent nephrotic syndrome

Patient/parent education

- Reassurance that despite a relapsing course progression to end stage renal disease is rare.
- Urine examination by sulfosalicylic acid (SSA), dipstick or boiling should be taught
- Maintain a diary showing proteinuria and medication received
- Ensure normal activity
- Protection against infection

Referrences

1. Consensus Statement on Management of Nephrotic Syndrome. Indian Paediatric Nephrology Group, Indian Academy of Paediatrics, Indian Paediatrics, 2001, 38: 975-896.

FEBRILE SEIZURES

Febrile Seizures are brief (2-5 min), generalized tonic-clonic and self limited seizures followed by a brief post-ictal period of drowsiness, in an otherwise healthy, febrile child of 6 months to 5 years of age, without any evidence of underlying neurological disease. They are the most common seizure disorder during childhood, with a uniformly excellent prognosis. They occur rarely before 6 months and after 5 year of age. The peak age of onset is approximately 14 -18 months of age, found in 3-4% of young children. There is a strong family history of febrile convulsions in siblings and parents, suggesting a genetic predisposition. Except for the cases at high risk (see below), simple febrile seizures rarely develop into epilepsy.

Salient features

- Febrile seizures usually occur when the temperature is rising rapidly, to generally 39°C (102°F) or more of core temperature. They are of two types:

- **Typical (Simple) febrile seizure** occurs on day 1 of fever, does not last for more than 10 minutes; generalized tonic-clonic; generally not more than one episode within 24 hours.
- **Atypical or complex febrile seizure** may persist for more than 15 minutes; it could be focal in nature; more than one episode of seizure in 24 hours; associated with abnormal neurological findings or deficits. An organic cause such as an infectious or toxic process, should be considered and investigated.

- Lumbar puncture: A lumbar puncture with examination of CSF is essential to rule out possibility of meningitis in cases with first episode of febrile seizures
- EEG is not required in case of simple febrile seizures. However, in cases with atypical febrile seizure or in a child with high risk for developing epilepsy, it may be helpful.
- High risk for developing epilepsy, include a positive family history of epilepsy, initial febrile convulsion prior to 9 months of age, a prolonged or atypical febrile seizure, delayed developmental milestones and an abnormal neurological examination.

Treatment

Careful search for the cause of fever and treatment of fever (see section on fever).

Most febrile seizures are brief and would be over by the time a child is brought to the doctor or health facility.

Nonpharmacological

Clear the airway, semi-prone lateral position and oxygen therapy.

Pharmacological

In cases presenting with seizures, the mainstay of management is prompt administration of anticonvulsants.

The best drug is Diazepam in a dose of 0.3 mg/kg by slow intravenous or rectal route. It can be repeated if seizures do not subside (per rectal dose may be given up to 0.5 mg/kg/dose).

Intermittent prophylaxis (during febrile illness) It is a safe and effective method of prophylaxis.

Tab/Syp Diazepam 0.3 mg/kg/dose every 8 hours (1 mg/kg/day) for 2-3 days of febrile illness, started on the day of onset of fever. Dose can be adjusted if over sedation or ataxia noted.

Continuous prophylaxis

Phenytoin and carbamazapine are ineffective for prophylaxis and phenobarbitone has serious effects on cognitive function.

Sodium valproate is effective but potential risk do not justify its use.

Patient/parent education

- The parents and caretaker should be assured of the benign nature of the disease and should be told that no neurological deficit or mental retardation occurs as a result of simple febrile seizure.
- They should be taught about control of fever at home. They can be taught to give diazepam per rectally at home.
- Routine immunization as per schedule should be followed. After DPT vaccination, oral paracetamol 15 mg/kg/dose every 6th for 2 or 3 days and similarly, after measles vaccination, oral paracetamol in the same dose started on the 4th day from the day of vaccination and given for 3 to 4 days to avoid precipitation of febrile seizures.

References

1. Febrile Seizures. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 1818-1819.
2. Protocol for Childhood Neurological Diseases: Manual by Expert Group of SAARC Countries, 1999.
3. Febrile Seizures: An update, Indian Paediatrics 1995, Vol 32: 566-572.
4. Long-term Outcome of Prophylaxis for Febrile Seizures. Arch Dis Child 1996, 74:13-16.
5. Recurrence Risk after First Febrile Seizure and Effect of Short-term Diazepam Prophylaxis. Arch Dis Child 1985; 60:1045-1049.

ACUTE MENINGOENCEPHALITIS

Acute meningoencephalitis is an acute inflammatory process involving meninges and brain tissue, due to infectious causes. The common aetiological agents are viruses and bacteria.Children of any age may be affected.

Salient features

Fever, headache, vomiting, irritability altered state of consciousness, signs of meningeal irritation and seizures. Children of any age may be affected.

- CSF examination differentiates the viral from bacterial cause of acute meningoencephalitis. (Table 1).

Treatment

Supportive treatment is the mainstay of therapy and is started immediately.

1. Maintain airway, breathing and circulation.

2. Control of seizures with IV injection of Diazepam 0.2 to 0.4 mg/kg stat followed by Inj Phenytoin 10-20 mg/kg stat followed by 5 mg/kg/day in divided doses.
3. Increased Intra-cranial tension is treated by proper positioning of patient with head elevated at 15 -30° position, fluid restriction to 2/3rd of maintenance, 20% Mannitol 5 ml/kg over 10-15 min followed by 3 ml/kg every 6 hourly for 48 hours and then SOS.

   Or

   Acetazolamide 50-75 mg/kg/day in 3 divided doses through feeding tube

   Or

   Glycerine 1 ml/kg/day through feeding tube may be added if increased intra cranial tension persists.
4. Fever is controlled as given in section on fever. (**CAUTION:** Never give aspirin*).*
5. The intravenous fluid is given at 2/3 of the maintenance requirement initially. The electrolyte concentration of the blood is monitored very closely. Any imbalance is treated promptly. Fluid restriction is not done if patient is dehydrate or is in shock.
6. Feeding: Initially the patient is kept nil orally for first 24-48 hours. Later on the feeding is guided by the level of sensorium. A tube feeding is helpful for feeding as well as for giving medicines.

Table 1. ***CSF findings in meningoencephalitis.***

	Pressure (mmH_2O)	Leucocytosis (mm^3)	Protein (mg/dl)	Glucose (mg/dl)
Normal	50-80	<5, >75% Lymphos	20-45	>50 or 75% serum glucose
Acute bacterial meningitis	Usually elevated (100-300)	100-10,000 PMN's* predominate	100-500	Decreased (<40)
Acute viral meningoencephalitis	Normal or elevated	Rarely >1000 PMN's early but Lymphos predominate in the most of the course	50-200	Normal rarely decreased
Tubercular meningoencephilitis	Usually elevated	100-500 PMN's early but later lymphocytes predominate	100-3000	<50

*PMN's = Polymorphonuclear leucocytes

Specific treatment

Until a bacterial cause is excluded, parenteral antibiotic therapy should

be administered. The choice of antibiotics depends upon age of the patient and prevalence of organism in the area.

Age 0-3 months

1. Inj Cefotaxime 200 mg/kg/day IV in 4 divided doses for 14 days.

2. Inj Ampicillin 300 mg/kg/day IV in 4 divided doses for 14 days.

Age 3 months - 12 years

1. Inj Ceftriaxone 100 mg/kg/day IV in 2 divided doses for 10 days

Or

Inj Cefotaxime 200 mg/kg/day in 3 divided doses for 10 days

Or

Inj Ampicillin 300 mg/kg/day in 4 divided doses for 10 days

2. Inj Chloramphenicol 100 mg/kg/day in 4 divided doses for 10 days

If meningococcus is suspected/isolated

Inj Penicillin G 300,000 - 400,000 IU/kg/day in 4 divided doses for 7-10 days.

Viral meningoencephalitis

Herpex simplex virus: (generally diagnosed by focal encephalitis or CT scan)

Inj Acyclovir 30 mg/kg/day in 3 divided doses for 145-21 days

Non HSV viral encephalitis is treated by supportive therapy only.

The lumbar puncture is repeated at 48 hours to see the response. However, if the patient is improving well, a repeat lumbar puncture may not be necessary.

Advise at discharge

1. Regular follow up for neurological assessment including deafness is advised.
2. Anticonvulsant therapy to be continued if seizures are recurrent during course of meningitis.
3. Children with sequated would require assessment of handicap and multidisciplinary management. Occupational/physiotherapy may be taught during hospital stay it self.

References

1. Central Nervous System. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 751-761.
2. Paediatric Infectious Diseases; 4th Edition pp 457-468.
3. Acute Viral Encephalitis in childhood. BMJ 1995; 310: 139-140.

TUBERCULOUS MENINGITIS

Tuberculous meningitis is the inflammation of meninges due to lymphohematogenous spread of the primary infection of tuberculosis to the meninges, found in about 0.3% of untreated primary infection in children. It is the most dangerous form of extra-pulmonary tuberculosis. 70% of the cases are found in children less than 5 years of age.

Salient features

- The clinical progression of tubercular meningitis (TBM) may be rapid or gradual. The signs and symptoms progress slowly over several weeks and can be divided into three stages.
  - The 1st stage, which typically lasts 1-2 weeks, is characterized by non-specific symptoms, such as fever, headache, irritability, drowsiness and malaise. Focal neurologic signs are absent.
  - The 2nd stage usually begins more abruptly. The most common features are lethargy, neck-rigidity, seizures, positive Kerning or Brudzinski signs, hypertonia, vomiting, cranial nerve palsies and other focal neurologic signs.
  - The 3rd stage is marked by coma, hemiplegia or paraplegia, hypertension, decerebrate posturing, deterioration of vital signs, and eventually, death.
- Complications: Survivors may have motor deficits, cranial nerve deficits, mental retardation, learning disabilities, seizures, hydrocephalus, blindness, deafness and diabetes insipidus.
- The diagnosis is made by analysis of CSF on lumbar puncture, which shows lymphocytic leucocytosis with elevated protein and a low sugar (for details see table 1 in section on meningoencephalitis on page 484).

Demonstration of AFB in CSF confirms the diagnosis, but the yield is very poor.Culture of CSF shows growth of *M. tuberculosis*, takes too much time.Positive tuberculin skin test corroborates the diagnosis but may be negative in severely malnourished/disseminated disease. 20-50% of children have a normal chest radiograph others may show primary disease. CT Scan or MRI of brain may be normal during early stages of the disease. Later, it can show exudates in the basal cisterns of brain, periventricular ooze and hydrocephalus. Some may show tuberculomas even.

Treatment

Treatment consists of proper supportive care, including non-pharmacological treatment, specific antitubercular therapy, treatment of increased intracranial tension and, if required, surgical treatment.

Nonpharmacological

1. Nutrition: after initial stabilization, nutritional rehabilitation should be done as given in section on protein energy malnutrition.
2. Skin care and prevention of bedsores.
3. Care of bowel and bladder.
4. Physiotherapy and occupational therapy should be instituted early to prevent deformities and contractures..

Pharmacological

1. Appropriate fluid therapy to correct dehydration due to frequent vomiting and decreased oral intake.
2. Treatment of SIADH. Fluid restriction to 3/4or $2/3^{rd}$ of maintenance. Treatment of raised intracranial tension
3. Inj: Dexamethasone: 0.15 mg/kg IV 6 hourly for 2 weeks followed by Tab Prednisolone 1.5 mg/kg/day orally through feeding tube for 4 weeks.This should be tapered over another 2 weeks. A total of 6-8 weeks therapy with steroid is recommended.
4. Mannitol (20% solution) 1.5 to 2 g/kg or 8-10 ml/kg over 30-60 minutes. Repeated every 6-8 hours for 7 days. Lower doses (0.25 g/kg/dose) can also be tried.

   Or

   Inj: Glycerol 1 ml/kg/dose every 6-8 hours, diluted in orange juice or water, given through feeding tube.

   Or

   Tab: Acetazolamide 50 mg/kg/day, in 3 divided doses for 2-3 weeks.
5. Anticonvulsant therapy - presence of seizures necessitates treatment with phenytoin or carbamazepine in appropriate doses.
6. Specific antitubercular therapy - as given in management of tuberculosis (see section on tuberculosis).
7. Surgical Treatment **Ventriculoperitoneal Shunt (VP Shunt):** All TBM show some degree of hydrocephalus by 4 weeks. Obstructive hydrocephalus should be shunted immediately. Non obstructive hydrocephalus with increased intracranial pressure as shown by ventricular tap or CT scan will also be benefited by VP shunt. An early shunt is preferable.

Follow up

- Patient should be kept under follow up after discharge from the hospital and assessed for neurological deficit and features of increased intracranial pressure (ICP). One of the common cause of increased ICP is untreated hydrocephalus or blocked shunt.

- Check compliance to drugs and ensure that occupational therapy/ physiotherapy is being continued.
- Assess physical, mental, visual and auditory handicap and take expert opinion for rehabilitation from other specialists.

Patient/parent education

- Seriousness of disease must be explained.
- Context survey should be done and any other member in the family found to have active TB should be counselled to attend TB clinic for therapy.
- Need for compliance should be emphasised
- Drug toxicity and side effects must be explained.
- Neurological deficits may appear even in a patient on therapy.

References

1. Neurotuberculosis with Special Reference to Management of Tubercular Meningitis in Children, 1982, Bull. Int. Union Tuberc, 57, 43-48.
2. Three Chemotherapy Studies of Tubercular Meningitis in Children. Tubercle 1986, 67: 17-29.
3. Tuberculosis in Children. A Statement of Scientific Committee of IUATLD, 1991 Bull Int Union Teberc Lung Dis , 66: 61-67.
4. Treatment of Tuberculosis: Consensus Statement of IAP Working Group. Indian Paediatric 1997, 34: 1093-96.
5. Jacob RF, Sunokorn P. Tuberculous Meningitis in Children: An Evaluation of Chemotherapeutic Regimens,1990 Ann Rev Resp Dis, 141: (5) A 337.
6. Dexamethasone Adjunctive Treatment for Tuberculous Meningitis. Paediatric Inf Dis 1993, 39: 361-64.
7. Mycobacterial Infections. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 885-897.

NEUROCYSTICERCOSIS

The neurocysticercosis is the disease produced by invasion of the CNS by the cystic stage (cysticercus) of pork-tapeworm (*Taenia solium).* It is the most common parasitic cause of CNS disease and is prevalent in every continent except Antarctica. Humans acquire the disease when they ingest the food or water contaminated with the eggs of *T. solium.*

Salient features

- The clinical features depend upon site and number of cysts in the CNS, and the inflammatory response of the CNS. It can present as a 'silent' case on one hand to encephalitis like symptoms. On the other hand any neurologic, cognitive, or

personality disorder in an individual from an endemic area may represent neurocysticercosis. However, the seizures, either focal or generalized, remain the most common form of presentation. Less common is the feature of meningeal irritation, hydrocephalus or increased intra-cranial tension. Decreased visual acuity may be seen in ocular cysticersosis. In spinal neurocysticercosis, patients present with evidence of cord compression, nerve root pain, transverse myelitis, or meningitis.

- Imaging studies (CT & MRI) and serologic tests (ELISA or immunoblot) are the only way to confirm the diagnosis. Cystic lesions with or without enhancement and calcifications are the commonest findings.

Treatment

Issues concerning when and how to treat are not completely resolved. Parenchymal lesions resolve even without treatment. Anticonvulsant drugs may be the only symptomatic therapy required. However, some workers suggest cysticidal therapy because it leads to rapid resolution.

Pharmacological

1. Tab Albendazole 15 mg/kg/day in 2-3 doses per day for 15 days, taken with fatty meals.

   Or

   Tab: Praziquantel 50 mg/kg/day in 3 divided doses for 15 days.

   Albendazole is as effective as Praziquintal.

   Patients should be monitored carefully for development of raised ICP. Tab Prednisolone 1-2 mg/kg/day started 2-3 days prior to cysticidal drugs and continued for 5-7 days may prevent these effects.
2. Anti-convulsants, such as carbamazepine or phenytion should be used in appropriate doses to control the seizures. An optimum duration of therapy has not been settled. However, a seizure free interval for even one year, may be taken as indication to taper off the therapy (for details see section on epilepsy).
3. Corticosteroid

   Currently, the use of corticosteroid is limited to following category of patients only:

   i. For patients who develop signs of increased intra-cranial tension during treatment.
   ii. Large sub-arachnoid cysts. (these cases have risk of developing cerebral infarcts due to occlusive endarteritis).
   iii. Encephalitis like features.
   iv. Cysticercal angitis.

Surgical treatment

a. A ventricular shunt must be placed if there is evidence of hydrocephalus. This should precede the medical treatment.
b. Surgical intervention is also required for removal of large solitary cyst for decompression, removal of mobile cysts causing ventricular obstruction, and some cases that fail to respond to medical therapy. (spillage of cyst contents is not seen in these cases as is seen in cases of echinococcosis).
c. Ocular cysticercosis should be treated surgically only; enucleation is frequently required.

Patient/parent education

- Minimising the opportunities for ingestion of facally derived eggs by means of good personal hygiene, effective faecal disposal and treatment and prevention of human intestinal infections.
- All members of a family of an index case of cysticercosis should be examined for the presence of eggs or signs of disease.
- Prolonged freezing or thorough cooking of food items, pork in this case, will kill the parasite.

References

1. Cysticercosis. In: Nelson's Textbook of Paediatrics. Behrman, Leigman, Jenson (eds), 16th Edition, 1999, pp 1078-1079.
2. Therapy for Neurocysticercosis. Clin Inf Dis 1993, 17:730-735.
3. Medical Treatment of Neurocysticercosis. Arch of Neurol 1995, 324: 1137-1139.
4. Albendazole Versus Praziquentel in the Treatment of Cerebral Cysticercosis. Transactions of Royal Soc Trop Med & Hyg 1991; 85: 244-247.
5. Dexamethasone with Albendazole. J Neurol 1990; 237: 279-280.
6. Etiology and Management of Single Enhanced CT lesion. Act Neurol Scand 1991, 84: 465-470.

20
DENTAL CONDITIONS

TOOTH AVULSION

One of the commonest sequelae of facial trauma is tooth avulsion or exfoliation.

Salient features

- History of fall, sports injury, assault or accident
- Patient presents with a bleeding socket, clot in the socket and a raw wound.

Treatment (Immediately refer to a dentist)

- Best result are observed if tooth is reimplanted within 5-10 minutes
- Fixation of implanted tooth with periodontal wiring, arch bar wiring or composite resin; fixation period 6 to 8 weeks; root canal treatment done after replantation only (to avoid desiccation of periodontal ligament).

Interim storage

- Best method is to place back the tooth in the socket immediately
- Other storage mediums are saliva, milk (placed in ice since this minimizes the adverse effects on the periodontal ligament) and saline

Pharmacological

1. Cap Amoxycillin 250-500 mg 3 times a day for 5 days

   Or

   Tab Ciprofloxacin 250-500 mg twice a day for 5 days
2. Tab Ibuprofen 400 mg 3 times a day for 3-5 days

   Or

   Tab Nimesulide 100 mg 2 times a day for relief of pain

References

1. Andreasen, J O, Andreasen, F M, Balkland L K, Flores, M T. In: Traumatic Dental Injuries - A Manual 1st edition Munksgaard 1999, pp 40.
2. Cohen S, Burns R C. In: Pathways of the Pulp. 5th Edition, Mosby 1991, pp 479.

TOOTH ACHE

The causes of toothache directly associated with tooth are caries, periodontal socket, abrasion, attrition, erosion and peridontitis. The indirect causes of toothache are maxillary sinusitis (recent bout of common cold), trigeminal neuralgia where pain is sudden, sharp, severe or short duration, like electric shock. Trigger zone may or may not be present.

Treatment

Pharmacological

1. Cap Amoxycillin 250 - 500 mg 3 times a day for 5 days
   Or
   Tab Ciprofloxacin 250 - 500 mg 3 times a day for 5 days
2. Tab Ibuprofen 400 mg 3 times a day for 3-5 days
   Or
   Tab Nimesulide 100 mg two times a day for 3-5 days

For specific treatment refer to a dentist

Surgical

Removal of irritant (like high filling, high spot on crown or bridge)
Excavation of caries and sedative dressing with clove oil
Anaesthetize the tooth and extirpate the pulp (if pulp is exposed)
Assess the response by getting immediate radiographs, radiograph after 6 weeks to assess bone loss and root resorption, and clinical assessment of mobility of tooth after 6 weeks

Patient education

- Maintenance of oral hygiene
- Importance of tooth preservation should be explained
- Pit and fissure sealing in paediatric patient
- Not to bite anything hard from anterior teeth during fixation period

References

1. Cohen S, Burns R C. Pathways of the Pulp. 5th Edition, Mosby 1991, 4, 27-28.
2. Grossman L I, Seymour O, Carlos D R. Endodontic Practice. 2nd Indian Reprint, Lea & Febiger 1991, 4, 26.

DENTAL ABSCESS

Patient presents with pain and swelling. The most common types of dental abscesses are periapical abscess and lateral periodontal abscess.

PERIAPICAL ABSCESS

Salient features

- Severe throbbing pain, disturbed sleep, tooth is tender to touch, is extruded, mobile and may be associated with localized or diffuse swelling.

Immediate treatment

To give antibiotics as given below and refer to a dentist

Pharmacological

Cap Amoxycillin 250 -500 mg 3 times a day for 5 days

Or

Tab Ciprofloxacin 250-500 mg two times a day for 5 days

Surgical

Drainage of pus to relieve occlusion by entering the pulp chamber. If fluctuant swelling of soft tissue is present drain by incision.

Extraction or root canal treatment should be done when acute symptoms subside.

Spread of infection should be closely observed to prevent complications like Ludwig's angina.

Patient education

- Maintenance of oral hygiene
- Control of diabetes mellitus, if present
- No hot fomentation over the skin

References

1. Kruger G O. In: Textbook of oral and maxillofacial surgery, 6th edition, C.V. Mosby 1984, pp 196.
2. Grossman I I, Seymore O, Carlos D R. In: Endodontic Practice 2nd Indian Reprint 1991, pp 20.

LATERAL PERIDONTAL ABSCESS

Salient features

- Same as in acute periapical abscess often associated with bad taste. Tooth is usually mobile and tender on tooth percussion, with associated localized or diffuse swelling of the adjacent periodontium.

- Vitality test usually positive if no associated pulpal problem.
- Radiograph shows vertical or horizontal bone loss in relation to the tooth.

Treatment

Pharmacological

1. Cap Amoxycillin 250-500 mg 3 times a day for 5 days
2. Tab Metronidazole 400 mg 3 times a day for 5 days

For surgical treatment refer to a dentist for debridement of pocket and drainage of pus and irrigation with chlorhexidine.
Spread of infection to be closely observed to prevent complications like Ludwig's Angina.

Patient education

- Maintenance of oral hygiene
- No hot fomentation over the skin
- Control of diabetes mellitus if present

References

1. Ramford and Ash. Peridontology and Peridontics. In: Modern Therapy and Practice, 1st Indian edition AITBS Publishers 1996, pp 126
2. Mitchell D A, Mitchell L. In: Oxford Handbook of Clinical Dentistry. 2nd edition, reprint 1996, pp 266.

DENTAL CARIES

This is a microbial disease of hard tissues of teeth characterized by demineralization of inorganic and destruction of organic part of the tooth.

Salient features

- Usually asymptomatic in early stages. Patient presents with tooth sensitivity and tooth ache.

Treatment

Examine for stage of caries and treat accordingly.

Nonpharmacological

In non-cavitated lesion and low risk patient with good oral hygiene practices, no treatment is given. In cavitated lesion, restoration is done

Pharmacological

Where caries is likely to progress (in high risk patient) pit and fissure sealout

1. Topical 2% Sodium fluoride
2. 0.2% Chlorhexidine mouth wash twice a day

Assessment of response to therapy

- For caries active patient - follow up visit every 3 months and to check the progression of white spot on the teeth.
- For normal patients - follow up every 6 months to 1 year to check the development of the white spot/cavitation

Patient education/prevention

For caries active/high risk patient preferably

- Diet control and avoidance of sugar containing food
- Frequent ingestion of food containing sucrose should be substituted by sugar free foods
- Oral hygiene: a) brushing of teeth twice a day b) flossing c) thorough rinsing after every meal
- Fluoride application using

  Topical 2% Sodium fluoride (by dentist) 4 applications at weekly intervals at the age of 3, 7, 11 and 13 years.

  0.05% sodium fluoride daily rinse, (should not be swallowed)

  0.2% sodium fluoride supervised weekly rinse in school (age of children >7 years) only if these children have been identified as caries active patients

References

1. Sturdevant CM. Roberson TM, Heymann HO, Sturdevant JR. In: The Art and Science of Operative Dentistry, 3rd edition, Mosby 1995, pp 100-120.
2. Mitchell DA, Mitchel L. In: Oxford Handbook of Clinical Dentistry, 2nd edition, reprint 1996, pp 28.

ADULT TYPE PERIDONTITIS

Most common dental disease includes diseases of the gum.

Salient features

- Swollen gums, bleeding from gums either spontaneously or on eating something hard, difficulty in chewing food, dull pain in the gums, pus discharge from gum on pressing, loosening of teeth, recession of gums.
- There is slowly progressive destruction of periodontitis, periodontal attachment loss and presence of periodontal pocket.

Treatment

Nonpharmacological

Advise brushing twice daily once after breakfast and once after dinner with super soft tooth brush for atleast 3 minutes and refer to a dentist for oral prophylaxis by thorough scaling and root planing.

Pharmacological

Local Therapy

1. Rinsing with 0.2% chlorhexidine twice daily
2. Gel Metronidazole to be massaged on the gums twice daily
3. Gel Chlorohexidine to be massaged on the gums twice daily

Systemic therapy

In adults Cap Tetracycline 250 mg 4 times a day for 5-7 days

In children very deep pockets: Combination of drugs i.e.,

1. Cap Ciprofloxacin 500 mg twice daily for 5-7 days
2. Tab Tinidazole 600 mg twice daily for 5-7 days

Recheck the depth of periodontol pockets, if it persist, refer to a periodontist for further management.

References

1. Ramford and Ash. Peridontology and periodontitis. In: Modern therapy and practice. 1st Indian Edition, AITBS Publishers 1996, pp 163.
2. Mitchell D A, Mitcchell L. In: Oxford handbook of clinical dentistry, 2nd edition reprint. 1996, pp 212.

JUVENILE PERIODONTITIS

Common in the age group of 13-25 years characterized by rapid destruction of periodontal tissues.

Salient features

- Mobility in incisors and molars, spacing in upper incisors, distolabial migration of upper incisors, arc shaped bone loss extending from distal surface of second premolar to medial surface of second molar.

Treatment

Pharmacological

Cap Tetracycline 250 mg 4 times a day for 14 days

Surgical

Extraction of badly involved teeth. Refer the patient to periodontist for

further periodontical management at the earliest

Patient education

- Proper brushing twice daily with super soft tooth brush.

References

1. Ramford and Ash. Peridontology and Periodontics. In: Modern theory and practice. 1st Indian edition AITBS Publishers 1996, pp 166.
2. Carranza. In: Clinical Periodontology, 5th edition, Saunders, pp 299.

INFLAMMATORY GINGIVAL ENLARGEMENTS

The gingival enlargement can be acute which is very painful or they can be chronic which may be painless.

Salient features

- Acute enlargements may be localised or generalised, very painful, deep red in colour, soft friable with shiny surface.
- Chronic type may be localised or generalised, often painless and slowly progressive.

Treatment

Pharmacological

1. Tab Ciprofloxacin 500 mg 2 times a day for 3-5 days
2. Tab Nimesulide 100 mg 2 times a day for 3-5 days
3. Rinsing with 0.2% Chlorhexidine twice daily

Refer to a periodontist for surgical management and drainage of pus

Patient education

- Proper brushing twice daily with super soft tooth brush

References

1. Ramford and Ash. Periodontology and Periodontics. In: Modern theory and practice. 1st Indian edition AITBS Publishers 1996, pp 145.
2. Shafer, Hine, Levy. In: A textbook of oral pathology. 4th edition, Saunders, pp 782.

GENERAL MEASURES FOR GOOD ORAL HYGIENE

1. Select the right quality of tooth brush which should be short, soft and have uniformly trimmed bristles
2. Brush teeth at least twice a day for 2-3 minutes particularly at night before going to sleep.

3. Use right technique of teeth brushing
4. Never use force while brushing
5. Avoid too much sugar and aerated drinks
6. Avoid eating in between meals, if can not be avoided rinse your mouth or preferably brush your teeth
7. Ensure regular dental checkup at 6 monthly interval

Tooth brushing is extremely important for cleaning teeth, for massage of the surrounding gums and maintaining oral hygiene. Regular brushing keeps the tooth surface free of plaque, which is soft material that gets deposited on the tooth surface and is the cause of dental caries and periodontal problems.

Appendix I

ANAESTHETICS LOCAL

Bupivacaine

Used for, infiltration anaesthesia, peripheral and sympathetic nerve blocks, dental anaesthesia, spinal, epidural and caudal anaesthesia

Bupivacine Inj 0.25%, 05% in vial injection for spinal anaesthesia 0.5% in 4-ml ampoule to be mixed with 7.5% glucose solution.		The smallest effective dose should be administered. The maximum cumulative safe dose for adults and children of a 0.25% solution of bupivacaine is 1.5 mg/kg **Unsuitable for intravenous regional anaesthesia**	
Anaesthetic procedure	Concentration	Dose in ml	Dose in mg
Local infiltration	0.25%	Up to 60 ml	Up to 150 mg
Peripheral nerve block	0.5%	Up to 30 ml	Up to 150 mg
Dental anaesthesia	0.5%	18-3.6 ml	9.0-18.0 mg
Spinal anaesthesia	7.5% (+8.25% gulcose)	1-1.5 ml	7.5-11.25

Lidocaine

Used for, surface anaesthesia of mucous membranes, infiltration anaesthesia, peripheral and sympathetic nerve blocks, intravenous regional anaesthesia, dental anaeshtesia, spinal epidural and caudal anaesthesia.

Lidocane injection, 1%, 2% in vial injection 1%, 2% in vial + Adrenaline 1: 200,000 in vial injection for spinal anaesthesia, 5% in 2-ml ampoule to be mixed with 7.5% glucose solution topical forms, 2-4% + Adrenaline 1:80,000 dental cartridge, 2% + Adrenaline 1: 80,000 in vial		The smallest effective dose should be administered. The maximum cumulative safe doses for adults and children are: 0.5%, 1% lidocaine 4 mg/kig 0.5%, 1% lidocaine + Adrenaline 5mcg/ml (1:200,000) 7 mg/kg		
Anaesthetic procedure	Concentration	Adrenaline	Dose	Dose (mg)
Local infiltration and peripheral nerve block	0.5%	No	<50 ml	<250 ml
Surface anaesthesia	1.0%	No	<25 ml	<250 mgl
Pharynx, larynx, trachea, urethra	0.5	Yes	<80 ml	<400 mg
	1.0	Yes	<40 ml	<400 mg
	4%	No	1-5 ml	40-200 mg
	4%	No	10 ml	400 mg
Dental anaesthesia	20%	Yes	1-5 ml	20-100 mg
Spinal anaesthesia	5% (+7.5% glucose	No	1-1.5%	7.5-11.25

Tetracaine

A short acting local anaesthetic for the cornea and conjunctiva. It is effective after topical application to the eye and anaesthesia persists for at least 15 minutes.

Solution (eye drops), 0.5% one or 2 drops of 0.5% solution should be instilled into the conjunctiva sac

Adrenaline

Used with local anaesthetics to retard absorption of infiltrated local anaesthetics.

Inj 30 mg/ml in 1 ml ampoule

Local surgery 5 mg/ml (1:200,000) as a vasoconstrictor with local anaesthetic solutions

Dental surgery 12.5 mg/ml (1:80,000) are commonly used

Special note

Adrenaline should not be used in ring block of digits or the penis or other situations where there is a danger of local ischaemia.

References

1. Anaesthesia at the district hospital, second edition, World Health Organization in collaboration with the Federation of Societies of Anesthesiologists, Geneva: Organization, 2000.
2. Who Model Prescribing Information. Drugs Used in Anaesthesia. World Health Organization, 1989.
3. Anaesthesia at the district hospital, World Health Organization in collaboration with the World Federation of Societies of Anesthesiologists, Geneva: World Health Organization, 1988.

UNIVERSAL PRECAUTIONS AND POST EXPOSURE GUIDELINES (Hepatitis B and HIV)

UNIVERSAL WORK PRECAUTIONS

a) Proper application or protective measures
b) Hand washing
c) Careful handling of sharp instruments
d) Safe techniques
e) Sterilization and disinfection
f) Disposal of disposables/reuseables
g) Use of personal barrier (gloves, masks, gowns/aprons/protective eye care, Foot cover
h) Immunization against HBV

Immediately after an exposure injury, the wound should be washed thoroughly under running water and squeezed (not sucked) to encourage bleeding. The site of injury should then be wiped with an alcohol impregnated swab and covered with a waterproof dressing.

Hepatitis B – Pre and Post Exposure Guidelines

Pre—Exposure	**Prophylaxis – with Hep B Vaccine**	
Ist dose	1ml	at elected date
2nd dose	1ml	1 month later
3rd dose	1ml	6 months after Ist dose

Children under 10 years of age should be given half of the above dosage at the same time intervals

Post Exposure Prophylaxis

At risk workers must report all needle stick injuries. Post exposure prophylaxis will depend on identification of the source of exposure, determination of the carrier status of the worker, determination of the carrier status if possible and the antibody status of the worker.
Immediately after an exposure injury, the wound should be washed thoroughly under running water and squeezed (not sucked) to encourage bleeding. The site of injury should then be wiped with an alcohol-impregnated swab and covered with a waterproof dressing.

Practical Guidance for Post Exposure Prophylaxis against Hepatitis B

Status of exposed worker	Hepatitis B Carrier Status of Source		
	Not identified/ not available	Negative	HBsAg/ HBsAg-positive
Unvaccinated	Vaccinate+ HBIG if avail.	Vaccinate	Vaccinate+HBIG
Vaccinated-antibody Titre <10 mIU/ml at time of accident	Booster dose	Booster dose	Booster dose+HBIG
Vaccinated-antibody titre >10 mIU/ml at time of accident	No action	No action	No action
No response to vaccine after 3 doses	HBIG if avail HBIG+2 further vaccine doses	2 further vaccine doses	HBIG+2 further vaccine doses
After 5 doses	HBIG if avail	No action	HBIG

HBIG = specific hepatitis B immunoglobulin
HB1G 0.05-0.07 ml/kg given within 24 h of exposure if possible
HBV 1.0 ml (20 mcg/ml) IM within 7 days of exposure if possible

Followed by 2nd and 3rd dose one and 6 months respectively after first dose

Post Exposure Prophylaxis (PEP) Guidelines for AIDS

Definition of an occupational exposure

An occupational exposure that may place a worker at risk of HIV Infection is a percutaneous injury, contact of mucous membrane or contact of skin (especially when the skin is chapped, abraded or afflicted with dermatitis or the contact is prolonged or involving an extensive area) with blood, tissue or other body fluids to which universal precautions apply.

Steps to be taken immediately following an exposure to HIV infected blood/body fluids and contaminated sharp instruments-the exposed area should be washed with soap and water; splashes to the nose, mouth or skin, should be flushed with water. Eyes should be irrigated with clean water, saline, or sterile irritants.

(CAUTION: Pricked finger should not be put into mouth reflexly)

Types of occupational Exposure to HIV for which PEP is Recommended.

Step 1: Determination of the Exposure code (EC) (see the flow charts below)

Step 2: Determination of the HIV Status Code (HIV SC) (see the flow chart below)

Step 3: Determine the PEP recommendation

EC	HIVSC	PEP Recommendation
1	1	PEP may not be warranted
1	2	Consider basic regimen. Exposure type poses a negligible risk for HIV transmission
2	1	Recommend basic regimen. Most HIV exposures are in this category: no increased risk for HIV transmission has been observed but use of PEP is appropriate.
2	2	Recommend expanded regimen. Exposure type represents on increased HIV transmission risk.
3	1 or 2	Recommended expanded regimen. Exposure type represents an increased HIV transmission risk If the source, (in the case of an unknown source), the Unknown setting where exposure occurred suggests a possible risk for HIV exposure and the EC is 2 or 3, consider PEP basic regimen.
EC	-	Exposure code
HIVSC	-	HIV status code

Basic regimen is for four weeks of Zidovudine (ZDV) 600 mg per day in two or three divided doses, and Lamivudine (3TC) 150 mg twice daily. Expanded regimen includes in addition Indinavir 800 mg every 8 hourly or Nelfinavir 750 mg three times a day.

Pregnancy and PEP

ZDV taken in 2nd and 3rd trimester of pregnancy has not caused serious side effects in mothers or infants. However, there is little information on the safety of ZDV taken during the 1st trimester or on the safety of other antiviral drugs taken during pregnancy.

Side effects of anti viral drugs

ZDV + 3 TC have usually been tolerated except for nausea, vomiting, diarrhoea, tiredness or headache.

Pre and Post test Counselling and testing

The person should be provided with pre test counseling. Before starting drug therapy 3-5 ml of reference blood sample is collected, serum is separated and stored in freezer at –20° C. First sample for ELISA/HIV

collected immediately after exposure, 2nd at 6 weeks, 3rd at 12 weeks and last at 6 months after exposure.

Use of PCR for diagnostic purpose

1) Detection of HIV infection in newborns
2) Indeterminate western blot/LIA/RIBA results
3) To monitor viral load levels during retro viral therapy
4) Site specific organ involvement
5) To determine HIV status during window period (2nd or 4th week after exposure)

Types of occupational exposure to HIV for which PEP is recommended

Step 1: Determination of exposure code

Step 2: Determination of the HIV Status Code (HIV SC)

Passive — Active Immunization

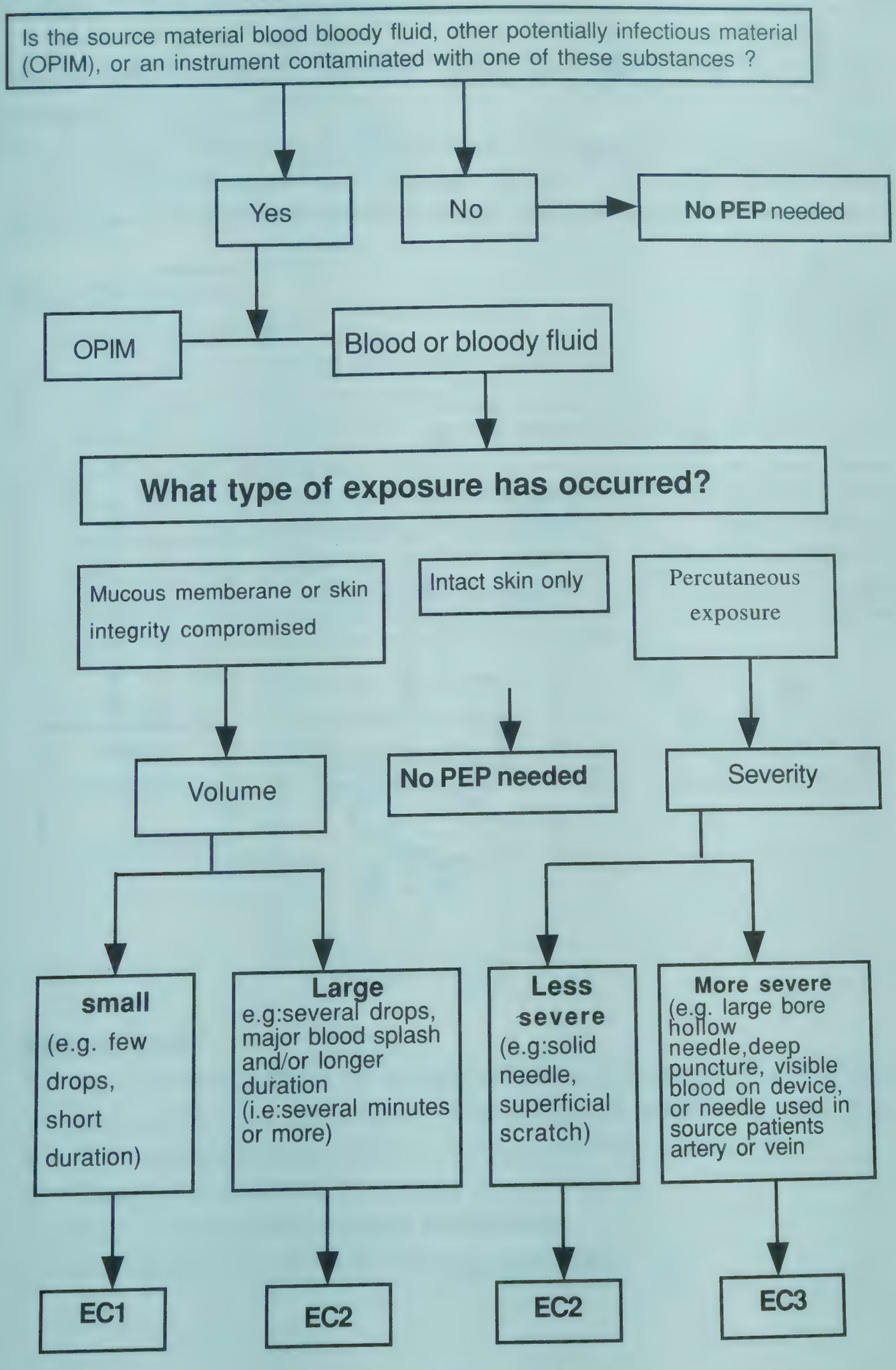
Simultaneous administration of HB1G (Hepatitis B immunogloubin) + HBV is ideal both for prophylaxis of persons accidentally exposed to blood known to contain HEP-B and prevention of the carrier state in the newborn babies of carrier mothers

Active Immunisation with HEPATIVAV B (MSD) + Hevac B Posture and indicated in following

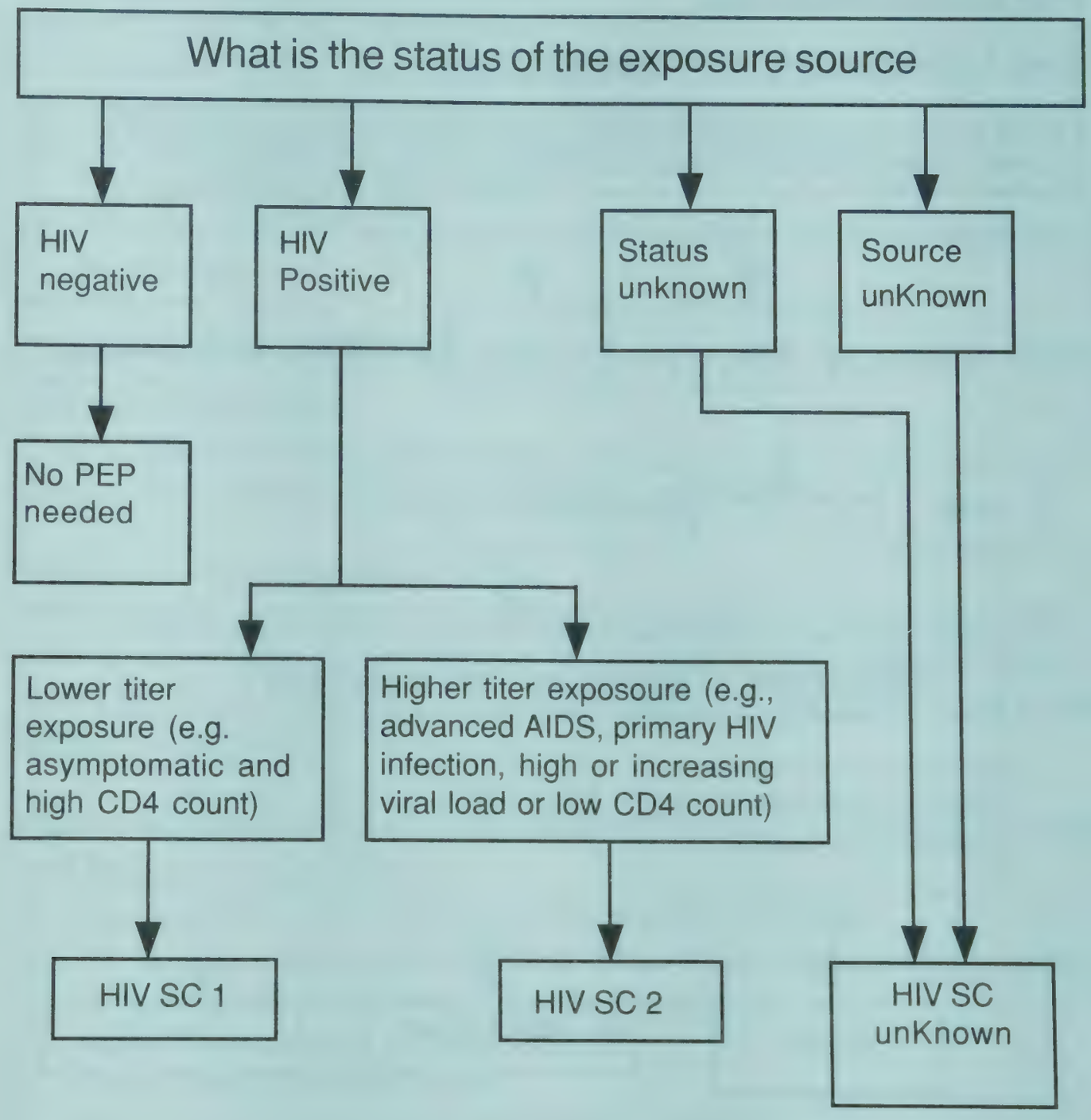
a) Neonates born to HVB infected mothers or carriers
b) Medical and paramedical staff with frequent exposure to human blood
c) Patients receiving frequent blood transfusion
d) Male homosexuals and prostitutes
e) Drug addicts using IV route
f) Sexual contacts of acute Hepatitis B patients
g) Sexual and family contacts of HBsAg positive chronic carriers
h) Residents and staff of institution for the mentally retarded
i) Children below 2 years in communities with a high carrier rate (15% or more)
j) Active and passive immunization in all cases of accidental infection by needle prick etc. and neonates born to infected mothers.

TYPES OF OCCUPATIONAL EXPOSURE TO HIV FOR WHICH PEP IS RECOMMENDED

Step 1. *Determination of exposure code*


Is the source material blood bloody fluid, other potentially infectious material (OPIM), or an instrument contaminated with one of these substances ?
Yes
No
No PEP needed
OPIM
Blood or bloody fluid
What type of exposure has occurred?
Mucous memberane or skin integrity compromised
Intact skin only
Percutaneous exposure
Volume
No PEP needed
Severity
small
(e.g. few drops, short duration)
Large
e.g:several drops, major blood splash and/or longer duration
(i.e:several minutes or more)
Less severe
(e.g:solid needle, superficial scratch)
More severe
(e.g. large bore hollow needle,deep puncture, visible blood on device, or needle used in source patients artery or vein
EC1
EC2
EC2
EC3

Step 2. ***Determination of the HIV Status Code (HIV SC)***


What is the status of the exposure source
HIV negative
HIV Positive
Status unknown
Source unKnown
No PEP needed
Lower titer exposure (e.g. asymptomatic and high CD4 count)
Higher titer exposoure (e.g., advanced AIDS, primary HIV infection, high or increasing viral load or low CD4 count)
HIV SC 1
HIV SC 2
HIV SC unKnown

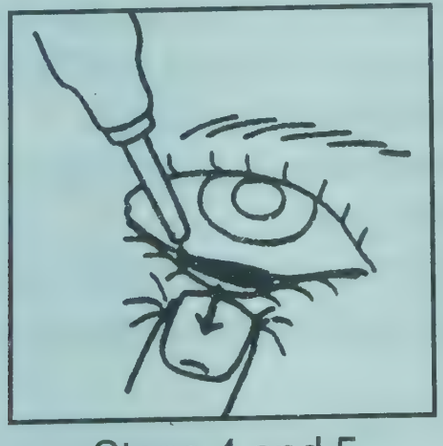
ROUTES OF ADMINISTRATION

Special Dosage Forms and the Method for their Administration

Step by step guidance for administering different dosage forms. This may be used to explain to the patient on how to administer a treatment correctly. It may also be useful to teach health workers.

Eye Ointment

1. Wash your hands.
2. Do not touch anything with the tip of the tube.
3. Tilt the head backwards a little
4. Take the tube in one hand, and pull down the lower eyelid with the other hand, to make a "gutter".
5. Bring the tip of the tube as close to the "gutter" as possible.
6. Apply the amount of ointment prescribed.
7. Close the eye for two minutes
8. Remove excess ointment with a tissue
9. Clean the tip of the tube with another tissue.

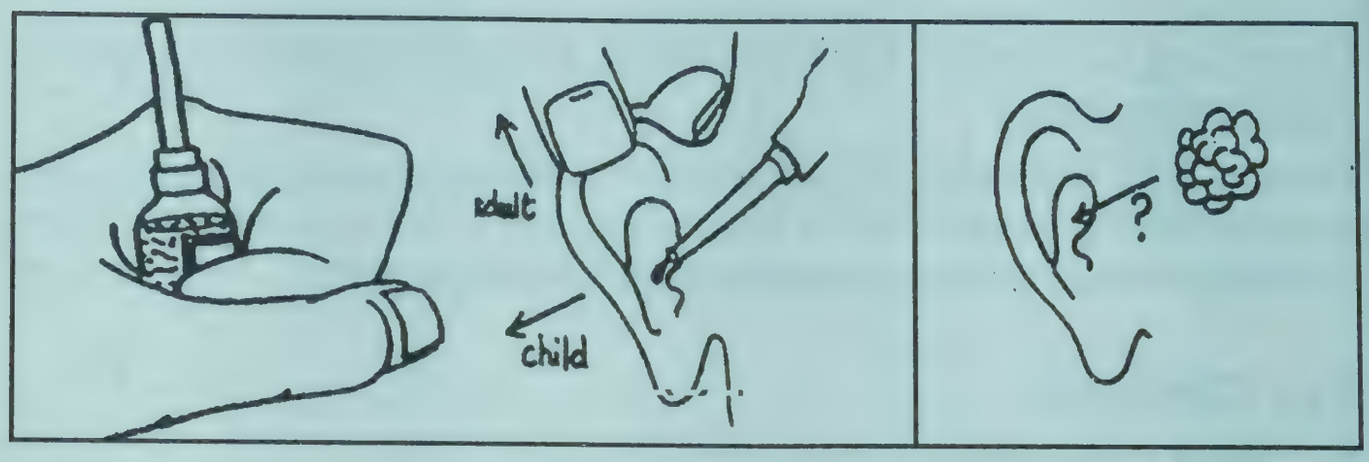


Steps 4 and 5

Ear drops

1. Warm the ear-drops by keeping them in the hand or the armpit for several minutes. Do not use hot water tap, no temperature control!
2. Tilt head sideways or lie on one side with the ear upward
3. Gently pull the lobe to expose the ear canal.
4. Apply the amount of drops prescribed.
5. Wait five minutes before turning to the other ear.

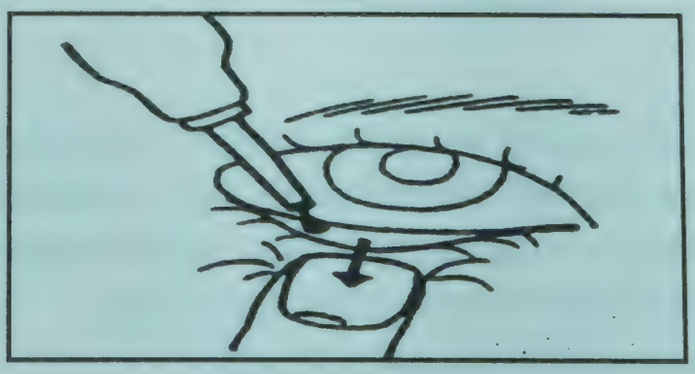
6. Use cotton wool to close the ear canal after applying the drops ONLY if the manufacturer explicitly recommends this.
7. Ear-drops should not burn or sting longer than a few minutes.



Step 1 Steps 2 and 3 Step 6

Eye-drops

1. Wash your hands.
2. Do not touch the dropper opening.
3. Look upward
4. Pull the lower eyelid down to make a "gutter".
5. Bring the dropper as close to the 'gutter' as possible without touching it or the eye.
6. Apply the prescribed amount of drops in the 'gutter'.
7. Close the eye for two minutes. Do not shut the eye too tight.
8. Excess fluid can be removed with a tissue
9. If more than one kind of eye-drop is used wait for atleast five minutes before applying the next drops.
10. Eye-drops may cause a burning feeling but this should not last for more than a few minutes. If it does last longer consult a doctor or a pharmacist.



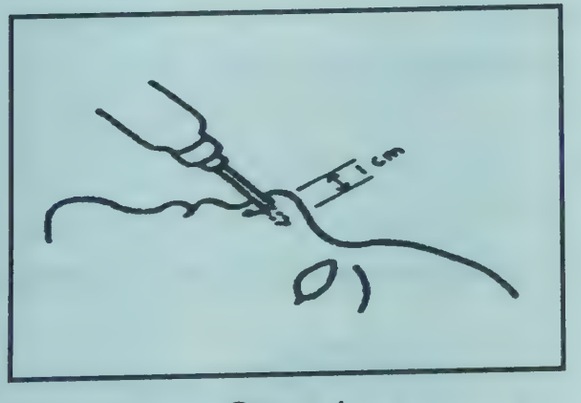
Steps 4 and 5

When giving eye-drops to children:

1. Let the child lie back with head straight
2. The child's eyes should be closed.
3. Drip the amount of drops prescribed into the corner of the eye.
4. Keep the head straight
5. Remove the excess fluid

Nasal drops

1. Blow the nose
2. Sit down and tilt head backward strongly or lie down with a pillow under the shoulders; keep head straight.
3. Insert the dropper one centimeter into the nostril.
4. Instill the amount of drops prescribed.
5. Immediately afterwards tilt head forward strongly (head between the knees).
6. Sit up after a few seconds, the drops will then drip into the pharynx.
7. Repeat the procedure for the other nostril, if necessary.
8. Rinse the dropper with boiled water.



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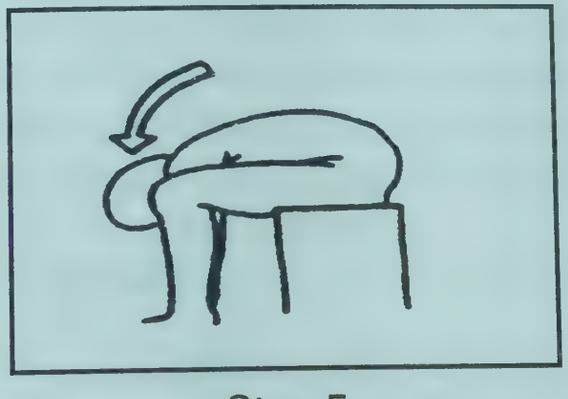
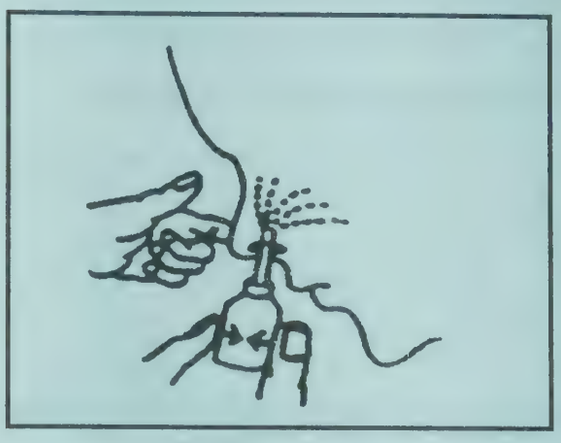


Step 5

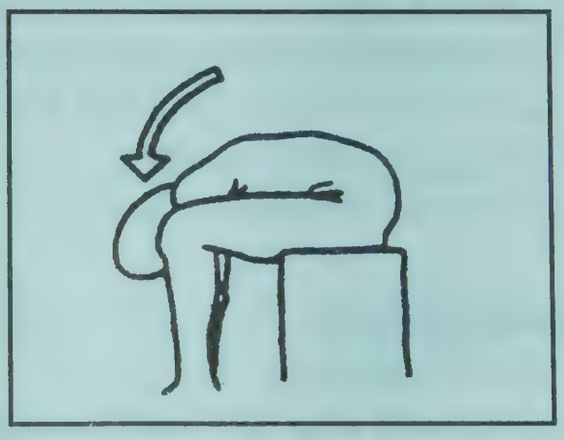
Nasal spray

1. Blow the nose.
2. Sit with the head slightly tilted forward.
3. Shake the spray.
4. Insert the tip in one nostril.
5. Close the other nostril and mouth.
6. Spray by squeezing the vial (flask, container) and sniff slowly.
7. Remove the tip from the nose and bend the head forward strongly (head between the knees).
8. Sit up after a few seconds; the spray will drip down the pharynx.
9. Breathe through the mouth.
10. Repeat the procedure for the other nostril, if necessary.

11. Rinse the tip with boiled water.



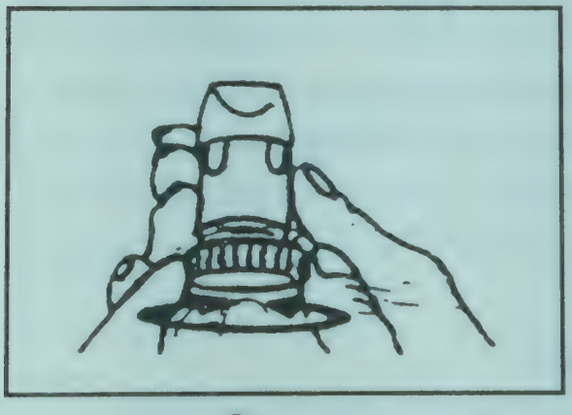
Steps 4 and 5



Step 7

Inhaler with capsules

1. Cough out as much sputum as possible.
2. Place the capsule(s) in the inhaler according to the manufacturer's instructions.
3. Breathe out slowly and empty lungs of as much air as possible.
4. Place lips tightly around the mouthpiece
5. Tilt head backward slightly.
6. Take a deep breath through the inhaler.
7. Hold the breath for ten to fifteen seconds.
8. Breathe out through the nose.
9. Rinse the mouth with warm water.



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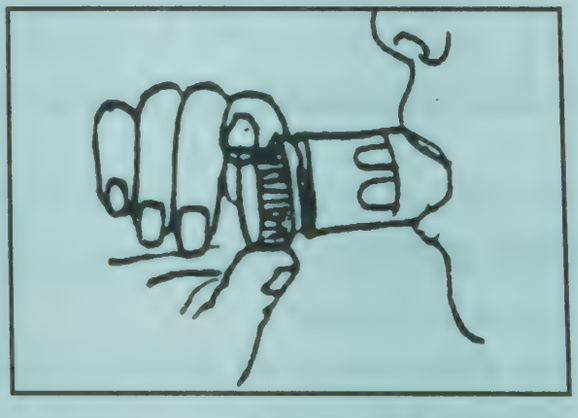
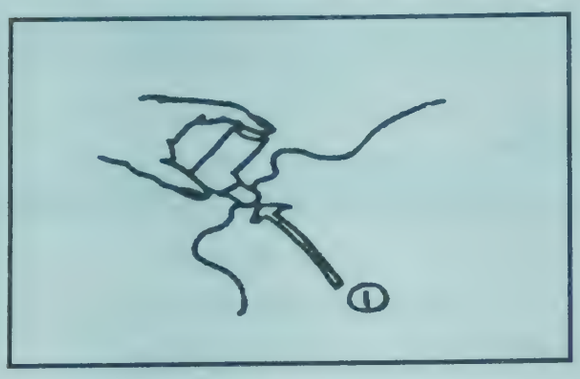


Step 5

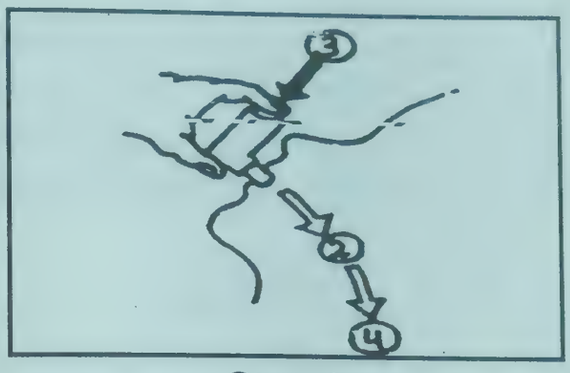
Aerosol

1. Cough out as much sputum as possible.
2. Shake the aerosol before use.
3. Hold the aerosol as indicated in the manufacturer's instructions (This is usually upside down).
4. Place the lips tightly around the mouthpiece.
5. Tilt the head backward slightly.

6. Breathe out slowly, emptying the lungs of as much air as possible.
7. Breathe in deeply and activate the aerosol, keeping the tongue down.
8. Hold breath for ten to fifteen seconds.
9. Breathe out through the nose.
10. Rinse the mouth with warm water.



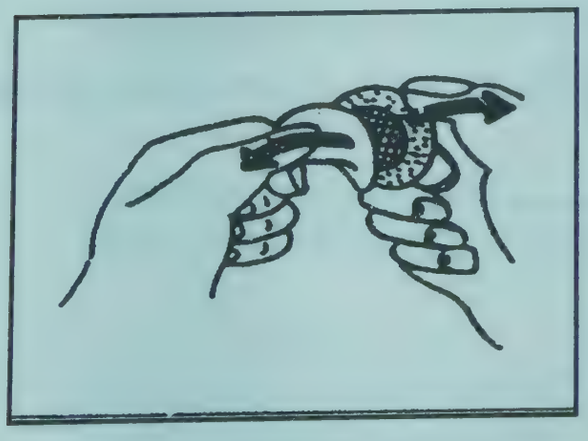
Step 4 and 5



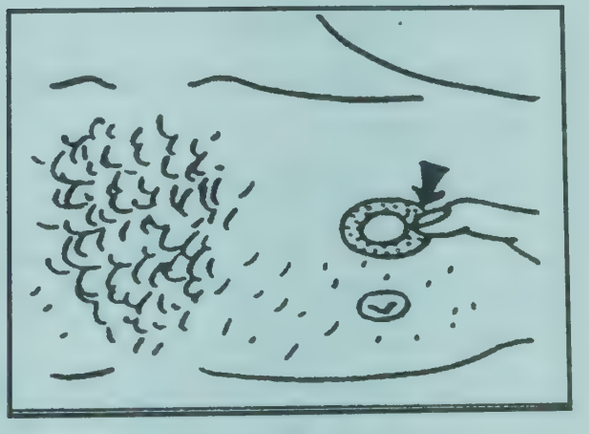
Step 8

Transdermal patch

1. For patch site see instructions included with the drug or check with your pharmacist.
2. Do not apply over bruised or damaged skin.
3. Do not wear over skin folds or under tight clothing and change spots regularly.
4. Apply with clean, dry hands.
5. Clean and dry the area of application completely.
6. Remove patch from package, do not touch 'drug' side.
7. Place on skin and press firmly. Rub the edges to seal.
8. Remove and replace according to instructions.



Step 7



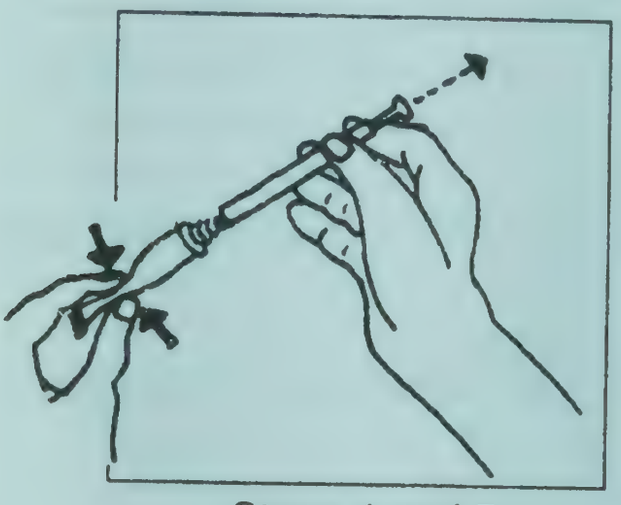
Step 8

Applying vaginal creams, ointments and gels

(Most of these drugs come with an applicator)

1. Wash your hands.
2. Remove the cap from the tube containing the drug.
3. Screw the applicator to the tube.

4. Squeeze the tube until the required amount is in the applicator
5. Remove the applicator from the tube (hold the cylinder).
6. Apply a small amount of cream to the outside of the applicator.
7. Lie on your back, draw your knees up and spread them apart.
8. Gently insert the applicator into the vagina as far as possible, do not use force.
9. Hold the cylinder and with the other hand push the plunger down thus inserting the drug into the vagina.
10. Withdraw the applicator from the vagina.
11. Discard the applicator if disposable or clean thoroughly (boiled water) if not.
12. Wash your hands.

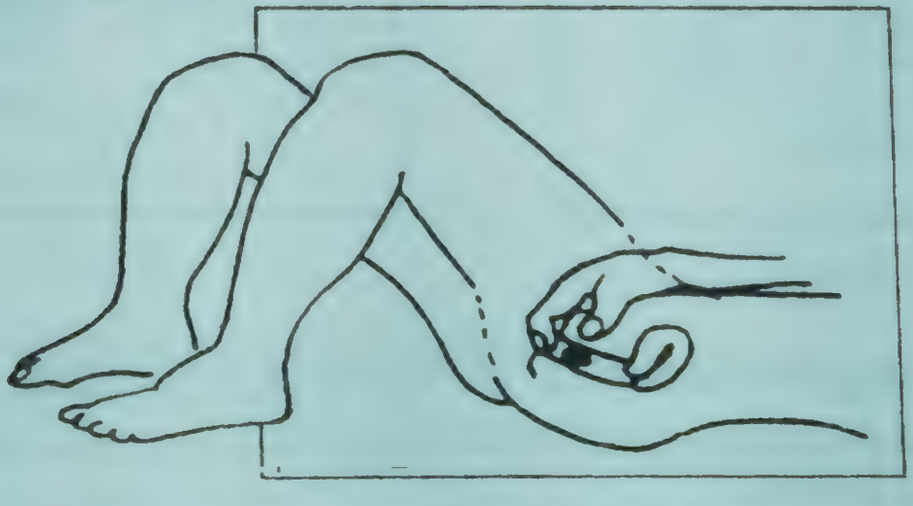


Steps 4 and 5

Steps 7 and 8

Vaginal tablet without applicator

1. Wash your hands.
2. Remove the wrapper from the tablet.
3. Dip the tablet in lukewarm water just to moisten it.
4. Lie on your back, draw your knees up and spread them apart.
5. Gently insert the tablet into the vagina as high as possible, do not use force.
6. Wash your hands.



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Condition for which modification suggested:

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SOME IMPORTANT PUBLICATIONS

- Delhi Drug Policy
- Delhi State Essential Drug Formulary
- List of Essential Drugs for Hospitals and Dispensaries in Delhi and Other States
- Promotion of Rational Use of Drugs in the Indian Scenario
- The Medicine Scenario in India : Perception and Perspectives
- Research on Rational Drug Use in India : A Glimpse
- Standard Treatment Guidelines for Karnataka, Mumbai & Himachal Pradesh
- HIV/AIDS and Traditional Medicines : A Journey to Dialogue

Delhi Society for Promotion of Rational Use of Drugs
National Institute of Immunology
Aruna Asaf Ali Marg, New Delhi - 110 067
Phone: 616 5776, 671 5256, 616 2281, 616 3006-9
Fax: 91-11-616 2125 & 610 9433
E-mail: dsprud@satyam.net.in
Visit us at www.dsprud.org

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